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TRANSLATIONS ON ENVIRONMENTAL QUALITY

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EAST GERMANY

BIOLOGICAL WATER PURIFICATION PROJECT DISCUSSED

East Berlin BAUERN-ECHO in German 3-4 Dec 77 p 8

[Article by Heiner Grienitz: "Self-purification by Nature Recreated; Biological Purification Installation for Buna; Highest Scientific-Technical Level at MMM"]

[Text] Protection of our oceans and rivers from a strong influx of sewage and water pollutants is among the most important tasks in our republic's environmental protection. The construction of sewage treatment facilities assures, to an ever greater extent, that all communal and industrial sewage is purified before reaching the waterways. Besides mechanical and chemical sewage purification, biological purification is increasingly gaining in importance. A few days ago, we reported that a joint youth collective with members from various enterprises for the biological purification stage of the Buna Central Purification Plant was awarded the prize of the Minister for Environmental Protection and Water Management at the 20th Fair of the Masters of Tomorrow (MMM) in Leipzig. Within this context, read the following report from our editorial staff member, Heiner Grienitz:

The program for keeping the Saale River clean stipulates as the most important measure the construction of a biological purification stage for the central purification plant of the VEB Buna Chemical Works.

In the biological purification stage, the natural processes in the self-purification of rivers are recreated in a most confined area--under an oxygen feed, aerobic microorganisms exhale the sewage constituents, thus creating carbon dioxide and water. The feeding of oxygen into the water is critical for biological purification. The introduction of oxygen takes place in two stages.

Sheet-jet aeration is the initial, i.e. intensive, stage. The sewage that flows over a discharge weir sweeps up air by the injection principle.

In the activation phase, oxygen is reintroduced into the sewage through a surface aeration centrifuge.

Dual phase aeration is distinguished by a very high purity and flow rate. It is especially well suited for the purification of organically severely polluted industrial sewage. In both stages, biological sludge, which is separated out in a final settling tank, is precipitated.

With a flow rate of 6,000 km/hr, the biological purification installation represents the largest industrial purification installation of its kind in the CEMA countries. The installation's daily discharge rate is equivalent to the sewage output of about 3 million inhabitants. The project of the biological purification stage of the Buna Central Purification Plant has been worked out on the basis of a resolution by the Council of Ministers and the Bezirk legislature. By way of a youth agreement, the task of working out the chemical engineering and some of the planning has been assigned to a youth collective. This youth collective includes young people from the VEB engineering center, Boehlen; the design office for chemistry, Leipzig; and the Buna Chemical Works.

A favorable solution has been found for the layout of the installation sections. The sewage to be purified flows out from the submerged jet stage all the way through the entire installation in a natural fall. This reduces the construction cost. The arrangement of the dual phase aeration constitutes a special innovation. An interconnected sewage purification system thus becomes unnecessary. A further advantage of the biological purification plant is the possibility, upon its completion at Buna, of making industrial use of the water in the circulation processes. The drawing of this water for industrial use from the Saale is reduced. The overall technical solution of the biological purification stage reflects the current high scientific-technical level in the field of sewage purification.

Compared to conventional installations of the same size, the 13.4 million in investments can be saved, of which 2.95 million can be allotted to materials management alone. In 1979, the biological purification stage in the VEB Buna Chemical Works will become operational.

CSO: 5000

EAST GERMANY

BRIEFS

PENALTIES FOR AIR POLLUTION--By decree of the Leipzig bezirk council, around 40 "pollution commissioners" are to go on duty by early January 1978. Their task is to provide for healthier environmental conditions in Leipzig and to take vigorous measures against stubborn air polluters. The decree, which primarily stipulates fines for enterprises negligent in control of dust and exhaust, also has consequences for automobile owners because, according to the Leipzig newspaper DIE UNION, exhaust tests and inspection of all measuring devices installed in Leipzig industries and motor vehicle workshops have shown that "without a doubt, more must be done" about motor vehicles to prevent their heavily contaminated exhaust from exceeding prescribed limits. Measurements in Leipzig's inner city have already indicated inadmissably high exhaust concentrations in the air. In the future, according to the newspaper, periodic exhaust emission tests are to be conducted in Leipzig workshops and engines are to be rendered ecologically harmless. [Text] [Bonn IWE-TAGESDIENST in German No 230/231, 1/2 Dec 77 p 3]

CSO: 2300

POLAND

POLLUTION BY BUILDING MATERIALS INDUSTRY EXAMINED

Krakow AURA in Polish Sep 77 pp 2-4

[Article by Prof Dr Roman Andrzejewski, Institute of Environmental Engineering Principles, Polish Academy of Sciences]

[Text] With the modern dynamic development of technology the indices of the specific emission of industrial pollutants undergo tightening and lowering, the production increases, but in the aggregate there are few changes in the over-all balance of the amount of pollutants emitted into the atmosphere. At this stage of the industrialization of the country this brings about an increase in air pollution. Limiting the amount of pollutants that used to be carelessly emitted into the atmosphere is costly, the more so as we wish to decrease their specific emission.

In the 1950's the problem was widely discussed concerning the degree to which the emission of pollutants should be limited, whether we should limit it irrespective of cost or should reduce it gradually in accordance with the economic possibilities of industry without taking into account the effect of pollutants on the environment. This last opinion prevailed although during recent years the increasing social and technical pressure introduced to it some corrections due to the increasing knowledge of the general harm of pollutants to the environment. The fact is that concern about the environment became the basis of international cooperation, begun at Stockholm, up to the historical conference at Helsinki. This determines the importance of the problem which requires concrete solutions based on the close cooperation of science, technology, economy and administration. Naturally, industry demurs against introducing costly and precise, highly efficient, dust-filtering devices or such methods which raise the cost of its production. Let us now see what kind of difficulties are being encountered by the introduction of methods of desulfurization of combustion gases in a power station.

There are in the world over 150 patents technically tested and put into operation in some places (Japan!). However, this is still a timid action since it entails the raising of the cost of the electric power supplied. Matters are different as regards retrieving from waste gases, in some branches of industry, those components of the emitted pollutants which are of a

potential value, as for example in the nonferrous metals industry. In the course of time, together with the advance of technology, the criteria of production wastes also undergo a change. One tries to create a wasteless closed cycle. From this viewpoint let us have a look at the building materials industry and at its greatest source of air pollution from the economic viewpoint, although this criterion in a socialist country is not the most important criterion but is only a part of the criterion of the concern for the health of man and its good conditions of work and life.

The greatest source of dust pollutants--for we limit ourselves to them--in the building materials industry is the cement building materials industry, the source of up to 97.6% of the dust produced by the building materials industry. It is not a trifling emission, for it amounts to about 500,000 tons of dust annually. We assume that the loss amounts to about 65 million zlotys annually.

The introduction of new technological solutions in the firing of clinker preferably by half-dry and dry methods is more energy-efficient (reduction of heat consumption by 50 percent) but entails an increase in dust convection. If dust-catching devices are not installed behind the furnace on the way to the chimney, then the dust convection becomes an emission, and therefore, causes an irretrievable loss for the plant as well as a great factor of harm for the environment.

To characterize the emission we make use in the first place of the indices of dust convection which for the given technological process should have a certain value, and the indices of the specific emission in kg of dust per ton of the product. From these two values we calculate the necessary efficiency of the dust-catching device. American data show that dust convection from a rotary furnace operated by a dry method averages 120 kg/ton of clinker, and with use of a wet method it averages 100 kg/dust per ton of clinker, which amounts to 10-12 percent with regard to the production of clinker. The indices of specific emission amount to 0.21 kg of dust per ton of clinker, which gives a concentration below 100 mg/m³ in waste gases, and an emission of 0.02 percent in relation to the production.

How does this matter stand in Poland? Selected modern furnaces show dust convection of 5.6-12.6 percent of the production amount, whereas the average emission, for the entire cement industry, according to statistical data of the Association of the Cement and Lime Industry, stands in 1974 at about 40 kg of dust per ton of clinker with a decreasing tendency to 31.5 kg per ton of clinker in 1975. Thus, the corresponding indices of specific emission amount to 4 percent and 3.15 percent. The emission in relation to cement production shows still better indices ranging from 3.35 percent in 1974 to 2.62 percent in 1975, without further reference to the structure of technology of cement production.

In relation to American standards, therefore, the Polish indices are on the average 150 times higher. On the other hand, compared with the countries of Western Europe, the situation does not look so hopeless, even though the FRG indices from 1975 are even better than the American ones. Let us take as a reference point the data from 25 years ago. The emission index for the wet

method for the long-flame chain-conveyor furnace in this case amounts to about 1 percent, that is about 10 kg/ton of clinker, and for the dry method, which at that time was still in its infancy, it reached up to 2.2 percent, that is about 22 kg/ton of clinker. Our industry, rapidly modernized, shows in 1975 an average emission of 3.15 percent, that is about 32 kg of dust per ton of clinker, while two-thirds of the production is obtained by means of the wet method, more advantageous from the viewpoint of dust emission. Thus, we have not yet even achieved in Poland the emission indices of 1950.

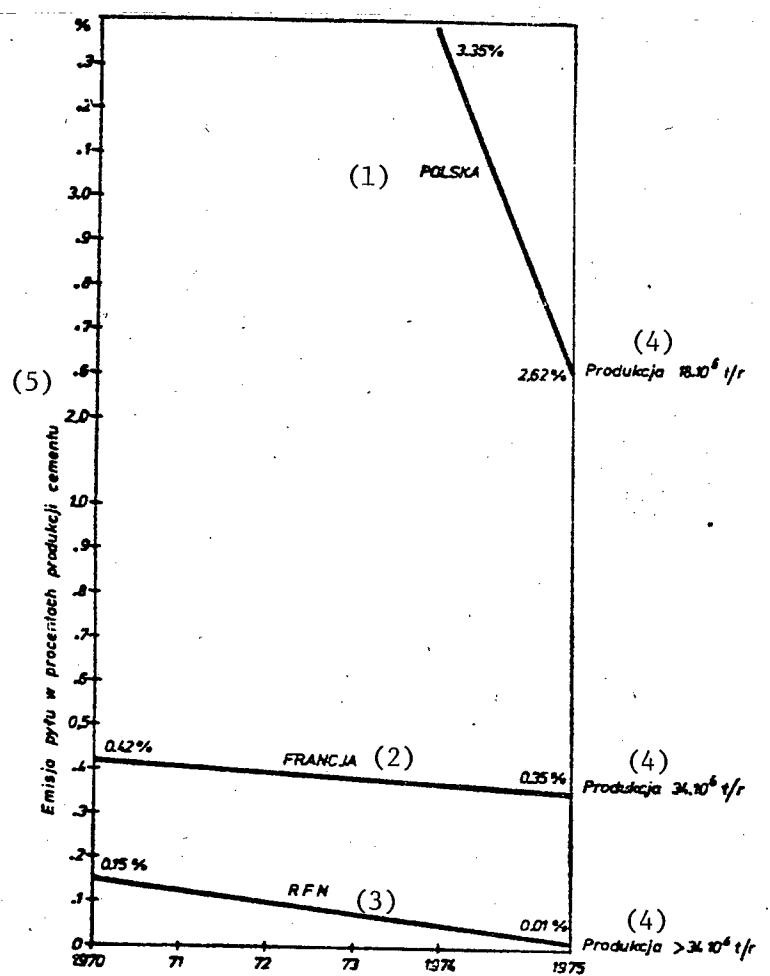
Meanwhile, during these 25 years in the West the emission indices underwent a considerable reduction. The diagram shows drastic differences among France, FRG and Poland. The dust emission in France in 1960 with the production of 15 million tons of cement amounted to 1 percent of production, whereas in 1970 with the production of 28.5 million tons of cement the index was reduced to 0.42 percent, and in 1975 with the production of 34 million tons it achieved the index of 0.35 percent. It should be noted that in France a norm of 150 mg of dust per m^3 of waste gases obtains, and in the FRG - 100 mg/ m^3 and intentions are to reduce it further to 50 mg per m^3 , while achieving the index of the specific emission 0.15 percent of the production in 1970 and even that of 0.01 percent in 1975. Compared with France the indices of the specific emission in Poland are 8 times higher, and compared with FRG more than 200 times higher. This is an enormous contrast. It is true that in 1974 - 1975 the index was reduced to 22 percent; however the achievement of the Western standard should be a task of the current 5-year plan.

What are the causes of a such high index of the specific emission? According to estimates of the Institute of Cementing Building Materials Industry in Opole, three fourths of the dust emission comes from rotary furnaces, and according to the data of the Association of Cementing Building Materials Industry this share has increased in recent years to 90 percent of the entire emission. Taking into account these last data, we see that the dust emission from furnaces constitutes the most important source of dusting, since it amounts to over 80 percent in the entire construction and building materials industry. In view of the fact that the convection indices of dust are comprised within the limits of American standards, the whole problem shifts directly, not to the technology of kilning but to the dust filtering equipment.

Table 2 shows differences between the rated efficiency of dust removal and exploitation efficiency on an annual scale. On the average they reach up to 20 percent, so that already here we have about 100,000 tons of dust annually, which is unnecessarily thrown into the atmosphere. This problem is not simple at all. It results from many factors which should be successively eliminated depending on the scale of the problem and specificity of the plant. In a general outline we can pose the following possibilities: Either the dust-catching equipment does not meet the designed or guaranteed efficiency of dust removal, or its operation connected with the production technology of kilning is improper, or the maintenance and servicing of electrical precipitators leaves much to be desired, or there are no electrical precipitators or they or they work in a condition far from that being designed, etc. One thing that results from the above is that more attention should be devoted to electrical precipitators used in the kilning of clinker. The question arises as to why in removing dust from gases in a lime kiln one can achieve an efficiency of 99.99 percent (in the case of Tarnow Opolski), whereas in rotary furnaces as a rule it does not even exceed 90 percent.

Diagram

Emission of Dust from a Cement Plant in Percentage
of Production in Poland, FRG and France



Key:

- 1. Poland
- 2. France
- 3. FRG

- 4. Production
- 5. Dust emission in percentage of cement production

Table 2

Effectiveness of Dust Removal with Electrical Precipitators of Rotary Furnaces for Kilning Clinker

Zakład (1)	Producent elektrofiltru (6)	Projekto- wana % (10)	Eksploatacyj- na % (11)
Cementownia (2) Rudniki	Dania Fab-Tudor	(7) 95	88, 87, 90
Cementownia (3) Nowiny	NRD-Lipsk Modern. Rlwo-Pe	(8) 98-99	76, 77, 79, 80, 78
Cementownia (4) Odra	ELWO Pszczyna	(9) 99	96, 95, 94, 98,5
Zakłady Bielawy (5)	ELWO Pszczyna	(9) 98-99	80,7-87,7

* Z. Malecki - Analiza zanieczyszczenia atmosfery przez przemysł cementowy, kwiecień 1975.

* Z. Malecki. Analysis of Atmospheric Pollution by Cement Industry, April 1975.

Key:	1. Plant	6. Make of Electrical Precipitators
	2. Cement Plant, Rudniki	7. Denmark Fab-Tudor
	3. Cement Plant, Nowiny	8. GDR-Leipzig. Modern. Rlwo-Pe
	4. Cement Plant, Odra	9. Wroclaw Electronic Plant, Pszczyna
	5. Bielawy Plant	10. Rated
		11. Produced, %

The dry method is characterized by a high convection of dust that requires the use of high-efficiency dust removal equipment. In this case putting an electrical precipitator into operation constitutes an important production element which also requires a precise observance of exploitation parameters (strict adherence to the kilning process) in order to reduce the indices of the specific emission. An important task that determines the efficiency of work of the electric precipitator is the collection of precipitated dust and its utilization.

It is worth mentioning that in the United States intentions are, because of excellent efficiency of dust removal with cloth filters, to use them exclusively about the year 2000 for removing fine dust particles (less than 3 um). For this reason vigorous research is being conducted in filtering fabrics and in electrical precipitators to improve their efficiency of dust removal in the range below 2 um. The elimination of the fall-out of dust particles of the size above 20 um should be the question of the near future and therefore attention should be devoted to the problem of precipitation of dust particles of Stokes diameter below 3 um which amounts to 43 percent of the waste gasses emitted from the rotary furnaces for kilning clinker after they have passed through the electrical precipitator. In adapting these data to Polish conditions we see that the emission of fine dust particles below 3 um in diameter amounted in 1975 to over 200,000 tons, that is 550 tons daily from the cement industry alone.

These fine dust particles suspended in air constitute a potential danger to the environment that is the more perilous as it is not recognized. It is well known that for estimate the extent of the fall-out we make use of a minimum grain diameter of 20 μm --in the FRG even the Stokes diameter of 10 μm is used--whereas the finer grains remain suspended in air for at least 100 hours under conditions of meteorological calm, and they increase their concentration in the case of temperature inversion. These dust particles form the centers of concentration of the vapors of acids and bases and as such display an aggressive nature of action on the environment.

How then do these enormous amounts of the emitted dust particles influence air pollution? The region of Opole may serve as an example. The measurements of the emission of dust performed in 1974-1975 by the Voivodship Sanitary-Epidemiological Station, concerned with the dust content of the air without giving its grain composition, at the height of 1.5 m above ground, show the increase of the mean annual emission from 620 ug/m^3 to 940 rg/m^3 , which according to American standards of 60 and 75 ug/m^3 constitutes an undesirable symptom. The content of SO_2 in the same region shows values of 200 to 120 ug/m^3 . Why do we speak of this? The share of the cement industry in Poland amounts to about 16 percent of the pollutants emitted. This industry has a technology based on powdered materials. Thus, it is understandable that the loss into the atmosphere according to the assumed removal efficiency, corresponding to the modern technology--which as we have seen considerably diverges in practice--involves very fine dust particles, the overwhelming percentage of which are respirable. Then remain for a long time suspended in air and affect the environment, including man, his health, animals, the vegetable kingdom, and materials.

Let us quote a few data from British and American research concerning the effect of the concentration of dust in air on men's health and materials, in order to draw attention on the degree of danger of too high a concentration of fine dust particles in the air. We must likewise note that the present emission standards do not give their grain-size composition but limit themselves to their mass content. In the United States they amount to 60 and 75 ug/m^3 , in industrial areas their concentration attains 250 ug/m^3 , and in Poland the mean daily concentration cannot exceed 200 ug/m^3 . A concentration of $100-150 \text{ ug/m}^3$ already reduces direct influx of solar radiation to one-third in summer and to two-thirds in winter. The concentration of about 150 ug/m^3 of dust particles with predominance of grain size of 0.2-1.0 μm , at a relative humidity of air below 70 percent causes a decrease of visibility to 8 km, a mean annual concentration (geometrical mean) of $60-180 \text{ ug/m}^3$, in the presence of sulfur dioxide and air humidity, considerably accelerates the corrosion of steel and zinc, not to mention its effect on the health of man. Among other things it is also the cause of the occurrence of respiratory diseases. For this reason the natural selfdefence of man should lead to a liquidation of the emission of these finest dust particles which according to the present state of technology is possible only by means of cloth filters.

In summing up we see that the technical progress in production should be coupled with the progress in methods and means of the protection of the

environment against the emission of pollutants. The permissible emission standards are estimated on the basis of permissible emission whose values undergo tightening with the progress of scientific research.

Table 1
Emission of dust in the Cement
Industry in Poland

	Symbol (12)	Jedno- sta- (13)	1974		1975	
Produkcja cementu	(1)	P	t/r	16.2.10 ⁶	100%	18.0.10 ⁶ 100%
Produkcja klinkieru	(2)	K	t/r	12.15.10 ⁶	75%	13.6.10 ⁶ 75,5%
Calkowita emisja pylu	(3)	E	t/r	544 000	3,35%	471 000 2,62%
Emisja pylu z pieców	(4)	E _K	t/r	496 000	3,06%	428 000 2,38%
Emisja pylu w mlyn. cement.	(5)	E _M	t/r	29 000	0,18%	28 000 0,16%
Emisja pylu z urz. pomocn.	(6)	E _R	t/r	18 000	0,11%	14,000 0,18%
Wskazniki emisji	(7)					
z pieca E _K /K	(8)	e _K	%	4,08		3,15
z pieca E _K /K	(9)	e _K	kg/t	40,80		31,50
całkow. E/P	(11)	e	%	3,35		2,62
E/P		e	kg/t	33,50		26,20

* ok. 66% metodą mokrą wg IPWMB

Key:

- 1. Production of cement
- 2. Production of clinker
- 3. Over-all dust emission
- 4. Emission of dust from furnaces
- 5. Emission of dust in cement mills
- 6. Emission of dust from ancillary equipment
- 7. Emission indices
- 8. from E_K/K furnace
- 9. from E_K/K furnace
- 10. Over-all dust emission
- 11. Dust emission
- 12. Symbol
- 13. Unit

*about 66% with wet method according to the Institute of Cementing Building Materials Industry.

We are confronted with the task of lowering the emission of dust particles with a grain-size above 10 μm , endeavoring the greatest possible limitation of dust losses, since this dust is a production material. Fall-out, on the other hand, is the index of pollution of the region which indirectly influences the pollution of water, soil, and forests; we also must lower the contents of respirable dust particles in the emitted dust whose grain com-

position is close to the grain composition of dust particles carried in the given region to the height of the emission. This involves a wide range of scientific research work on the following:

1. achievement of better efficiency of dust removal in electrical precipitators;
2. utilization of cloth filters for removing dust from waste gases in rotary furnaces by developing among other things the appropriate filtration fabrics;
3. utilization of the precipitated dust.

These problems should be discussed in their technical and economic aspects. However, in view of the fact that the building materials industry comprises besides cementing materials some other products as well, the discussion entails some other products as well, the discussion entails likewise technically difficult problems of removing dust from waste gases in the production of sintered aggregates, the situation in quarries and stone-dressing plants, and, in the first place, concept relative to the introduction of automatic information and control of atmospheric pollution in the regions of the concentration of building materials, for the best and fastest counteraction of the ascertained offence of the concentration of pollutants in air.

1015
CSO: 5000

INTER-AMERICAN AFFAIRS

CARICOM TO ADOPT REGIONAL ENVIRONMENTAL HEALTH STRATEGY

FL211500Y Bridgetown ADVOCATE-NEWS in English 16 Dec 77 p 18 FL

[Text] 15 Dec (CANA)--The Caribbean Community (CARICOM) Secretariat is to host a conference in Antigua June 5-9, 1978, that will adopt a regional environmental health strategy.

This was disclosed in a paper presented to a regional consultation on science and technology underway here by Dr. Philip Boyd, head of the Secretariat's Health Desk, and Mr. Raymond Noel, project manager for the environmental health strategy.

The project has been in operation since last March and has been compiling an environmental profile of each CARICOM state.

Its activities have included a series of inter-agency meetings attended by the Pan-American Health Organisation-World Health Organisation--(PAHO-WHO), the United Nations Environmental Programme (UNEP), the Caribbean Development Bank (CDB), and the Caribbean Community Secretariat.

The Caribbean Epidemiology Centre and the Commonwealth Foundation are also to be involved.

Following its initial work, the project identified five main areas to be covered by the proposed strategy: drinking water supplies, disposal of liquid waste, solid waste management and control, pollution of coastal waters, and industrial waste.

Following the Antigua workshop, the Secretariat will co-ordinate the search for resources to implement the strategy, particularly in the areas of water supply and sewage disposal, the paper said.

Aim of the project, as set out July 1976 by the health ministers' conference in Montserrat, is to define precisely the activities that would have to be carried out, including a target date for each activity.

Each CARICOM state would be free to adapt the regional approach to suit its own particular needs and circumstances. Project manager Noel was released from his substantive position as project manager of the Water Commission of Grenada, and funds for the post in the Secretariat have been provided by the Commonwealth Fund for Technical Co-operation (CFTC).

CSO: 5000

BRAZIL

BILL FOR CONTROLLING INDUSTRIAL POLLUTION DISCUSSED

Planning Minister Announces Pollution Control Bill

Rio de Janeiro JORNAL DO BRASIL in Portuguese 8 Dec 77 p 20

[Text] Brasilia--The minister of planning, Reis Velloso, announced, yesterday, a bill to be submitted shortly to Congress controlling the establishment and operation of industries in areas regarded as critical industrial pollution areas, by means of zoning.

According to the minister, who made a presentation on the problem, yesterday, to the CDE [Economic Development Council], this zoning will have no connection with the law on the use of ground or on city zoning, which will be the subject of a specific bill.

Regions Affected

The critical industrial pollution areas are the metropolitan regions of Sao Paulo, Rio de Janeiro, Belo Horizonte, Recife, Salvador, Porto Alegre and Curitiba, the regions of Cubatao and Volta Redonda, the hydrographic basins of the middle and lower Tiete, the Paraiba do Sul, the Jacui and the Guaiba, and the hydrographic basins of Pernambuco.

It will be up to the National Council on Urban Policy to prepare the bill specifying the basic guidelines for industrial zoning to be observed in the critical areas. Within 90 days after publication of the law, the Ministry of Planning and the Ministry of Finance will propose special financing plans for preventing and avoiding the effects of pollution caused by industrial establishments in accordance with criteria to be determined jointly with SEMA [Special Secretariat for the Environment] and the Ministry of Industry and Commerce.

Industrial zoning will also have as its objective, with regard to existing situations, to make a new location feasible as an adequate alternative, in the most serious cases, and also, in general, to specify time limits for the installation of pollution control equipment. The government will grant financing of pollution control equipment.

Bill Seeks To Restrain Pollution

Rio de Janeiro JORNAL DO BRASIL in Portuguese 20 Dec 77 p 16

[Text]--Brasilia--The president of the Republic has sent to the National Congress a bill establishing the rules for industrial zoning in metropolitan regions, according to which an enterprise, even if it is a nonpolluter, may not be established in an already saturated area, like Sao Paulo, a region saturated industrially and with a high degree of pollution.

Plants in those critical pollution areas will be subject to the simultaneous application of six guidelines: zone for strictly industrial use, zone predominantly for industrial use, zone for diversified use, combined with the classifications of "unsaturated," "on the way to saturation" and "saturated."

The document specifies rules supplementing Decree-Law 1,403, of August 1975, and that the establishment of strictly industrial zones will be the exclusive competence of the Union, when petrochemical complexes, chlorochemical complexes, carbochemical complexes, port terminals and nuclear power plants are involved.

Requirements

[1.] Location of industries in areas making it possible to attenuate the effects of pollution and to maintain ecological balance. The existence of basic infrastructure, especially water, transportation and power, will also be required.

[2.] Encouragement of the establishment of basic supplementary infrastructure services and reservation of areas for gradual expansion.

[3.] Prevention of any use not necessary to its basic functions, forbidding the introduction of any activities whatsoever capable of causing damage resulting from pollution.

[4.] Decision, whenever necessary, on the establishment and maintenance of pollution control methods to adhere to the criteria of the Special Secretariat for the Environment (SEMA).

[5.] Decision on the establishment and maintenance of a permanent inspection and security service against accidents and combat of their causes, in case of emergency.

Predominantly Urban Zones

In accordance with the bill, a "predominantly industrial zone" will be regarded as that zone located in urban areas or areas of urban expansion, intended exclusively for "those industrial establishments whose process of production may cause damage or inconvenience to urban activities."

The following guidelines will be observed:

- [1.] Existence of infrastructure necessary for them to operate adequately.
- [2.] Marking off, whenever necessary, of protection areas, aiming at preserving the urban zones or areas of proximate urban expansion from the effects of pollution.
- [3.] Compliance with the environmental standards to be determined by SEMA or the competent state agency.

Zone for diversified industrial use will be "those industrial establishments whose production process is complementary to the activities of the urban or rural environment in which they are located and does not jeopardize the health, well-being and safety of the neighboring inhabitants."

The bill specifies that industrial areas, regardless of their category, will be classified under three headings: "unsaturated," "on the way to saturation" and "saturated." It was specified that the degree of saturation will be measured in terms of the area available for industrial use, the existing infrastructure and the environmental standards determined by SEMA and specific regional agencies.

Pollution Control

The National Commission on Urban and Metropolitan Regional Policy (CNPU), together with SEMA, will be consulted at the time of preparation of pollution control programs and of granting permission for the establishment, operation or expansion of industries in the critical areas. Different levels of saturation will be established for each industrial zone category in accordance with the CNPU and SEMA criteria.

The Metropolitan Region Deliberative Council or the state government, in coordination with the municipalities concerned, may specify standards for the use and occupation of ground, determining the environmental reserve areas in which, owing to their "cultural, ecological and landscape" features "or to the need for preserving springs, the total or partial location of industrial establishments will be prohibited."

Granting Permission

Permission to establish, operate or expand industrial establishments in metropolitan regions or other critical pollution areas "will depend on adherence to the environmental standards specified by SEMA and by competent agencies and to the provisions of this law, in addition to the specific guidelines determined by the pertinent deliberative council or by the government of the state, pertaining to the following:

"I. Emission of odors, noises, vibrations and radiations.

"II. Danger of explosion, fire, harmful discharges and other emergency situations.

"III. Volume and quality of basic raw materials, of production, of personnel and of traffic generated.

"IV. Availability on the electric power, water, sewer, communications and other networks.

"V. Time schedule of the activities.

"Prior permission, referred to by this article, may be dispensed with by means of a report submitted for prior approval by SEMA and CNPU, in the case of industrial establishments whose production process does not affect the environment significantly."

10,042

CSO: 5000

BRAZIL

DECLINE IN POLLUTION IN SAO PAULO ANNOUNCED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 16 Dec 77 p 15

[Text] Belo Horizonte--It was announced yesterday by the director of CETESB [Basic Sanitation Technological Center], Nelson Nefussi, that there has been a significant decrease in atmospheric pollution this year, in Sao Paulo, primarily of carbon monoxide and sulfur dioxide. Meanwhile, the president of the Minas Gerais Technological Center (CETEC), Israel Vargas, reported that the situation in Belo Horizonte "is one of extreme concern and seriousness."

Those statements were made during the closing of the first meeting of state and municipal agencies responsible for environmental control sponsored by the Special Secretariat for the Environment (SEMA). The suggestions submitted at the end of the meeting will be forwarded for examination to all the organizations that participated in the meeting. SEMA's intention is to hold meetings quarterly to follow up on environmental control activities and on the organization of state and municipal agencies.

The following are outstanding among the principal suggestions submitted yesterday: reactivation of the project for the establishment of the National Environmental Control System, strengthening of state agencies by enabling them to become technically qualified, greater participation by those agencies in political decisions on the location of industries, and determination of parameters for industrial wastes in the various regions of the country.

The director of CETESB, Nelson Nefussi, stated that reduction of the rates of atmospheric pollution in Greater Sao Paulo, in 1977, was possible owing to the addition of 20 percent alcohol to gasoline, which caused a 15-percent reduction of carbon monoxide, and to the decision by PETROBRAS to supply boilers with oil with a low sulfur content during the four winter months. This brought about a 20-percent decline in the rates of sulfur dioxide.

The president of CETEC spoke on the situation of the Rio das Velhas Basin, with over 200 mining operations on its course and an unfavorable water quality. He pointed out that the mining code is not being obeyed.

10,042
CSO: 5000

BRAZIL

BRIEFS

GUANABARA BAY POLLUTION CONTROLLED--The main objective of the Pollution Control Group in Guanabara Bay (GEPOL) has been achieved. An emergency plan has been established involving various agencies capable of acting promptly in cases of accidental pollution of the waters of Guanabara Bay. A bill is also ready for the legislature for cases of oil-spills in the bay. This was reported by the president of the State Environment Engineering Foundation, Haroldo Matos de Lemos, who is also president of GEPOL. He said, also, that the directives for the classification of receiving bodies on the bay have already been approved, with quality standards for the water from 91 rivers, canals and streams emptying in Guanabara Bay. He added that, with those standards as a basis, "we are making a detailed register of all the polluting activities in the metropolitan region and we already have 5,000 recorded." [Text] [Rio de Janeiro JORNAL DO BRASIL in Portuguese 27 Nov 77 p 37] 10042

CSO: 5000

IRAN

RIVER POLLUTION KILLS FISH

Teheran ETTEL'A'AT in Persian 6 Dec 77 p 4

[Article: "Tens of Thousands of Fish Die in Rud-e Atrak"]

[Text] Mashhad--ETTEL'A'AT correspondent--A large number of fish in the Atrak River have died from poisoning and the extraordinary increases in pollution in the waters of this river.

Since several days ago the bodies of tens of thousands of fish which cover the surface of the river have attracted the attention of villagers living along its banks.

It is said that the Shirvan sugar factory, because its sewage project has not been completed, has caused the annihilation of the fish from Mashhad to Bojnurd.

On the basis of a complaint by the Environmental Protection Organization a file has been opened on this matter in the Shirvan district court.

Fish from the Atrak River used to be distributed in Teheran and Mashhad and were in great demand.

CSO: 5000

SOUTH AFRICA

COLLISION CAUSES WORST POLLUTION IN SOUTH AFRICAN HISTORY

Beaches Affected

Johannesburg THE STAR in English 31 Dec 77 p 1

[Text] More oil was being swept on to southern Cape shores today as workmen battled to clean up the worst marine pollution in South African history.

Most of the affected municipalities along the Garden Route coastline were confident last night of being able to clear in a matter of days, the previous spillage from the recent supertanker collision.

The senior lighthouse keeper at Mossel Bay, Mr Fred Hansen, today warned that there seemed to be no let-up in the amount of oil being washed ashore.

"There is plenty of oil all around," he said.

"The sea is covered with a sheen of oil and it is coming on to the beaches all the time."

The mood of residents and holidaymakers is as foul as the stench of the oil which has fouled the famous beaches for over 100 km.

Said Mr Oogies Brand, a Bloemfontein holidaymaker at Hartenbos with his family: "I don't know how they do it. They've got the whole sea to float about in but they have to come and crash here and turn our beaches into a disgusting mess."

The owner of the Mossel Bay Caravan Park, Mr N. Myerson, said today he estimated there were between 40,000 and 50,000 holidaymakers on the affected coastline.

"Most of them have already paid for their accommodation and are staying on.

The deputy town clerk of Mossel Bay, Mr D. V. Wilken said pollution at the town's two main beaches yesterday consisted of pellets of oil which could be cleared today.

The deputy town clerk of Plettenberg Bay, Mr E. I. Pullen, said all of yesterday's pollution--consisting of blobs about the size of chicken's eggs on average--had been cleared.

Worst hit by the oil were the Klein Brak and Groot Brak river areas. Oil entered both rivers and there are fears that prawn beds have been destroyed.

Oil Transfer Attempt

Johannesburg THE STAR in English 3 Jan 78 pp 1, 3

[Text] Seamen today started laying pipelines for the world's biggest ship-to-ship oil transfer which is scheduled to take place in Algoa Bay tomorrow.

A 311,500-ton tanker, the Litiopa, is now riding at anchor in Algoa Bay to take transfer of the 250,000-ton cargo of crude oil in the Liberian registered supertanker Venoil, crippled in a collision with her sister ship Venpet on 16 December.

"They've started linking pipelines to the two ships and if the weather stays calm the operation should start in earnest tomorrow," said Captain Tom Hains, Port Elizabeth's Port Captain, today.

Not Dangerous

"It's not a particularly dangerous operation but it's a tricky one. If the weather deteriorates overnight, they'll have to break contact between the ships and wait for more favourable conditions."

Captain Hains estimated the pumping operation would take between 24 and 36 hours and was confident there would be no further oil spillage to damage the already badly polluted Tsitsikama coastline.

He said there had "not been a drop of oil spilled" in the last ship-to-ship transfer--between the North Queen and the Lacoamica--some months ago.

The two tankers are anchored about 5 miles to sea from the port at Algoa Bay.

Captain Hains said the oil pollution threat had largely dissipated although workmen were still trying to clear sludge from the beaches along the Garden Route coastline.

Weather Hinders Efforts

Johannesburg THE STAR in English 4 Jan 78 p 3

[Text]

PORT ELIZABETH — Expert oilmen and conservationists held their breath today as four tugs battled for two hours in Algoa Bay to couple the two mist-shrouded 300 000-ton tankers, Venoil and Litiopa, for the world's biggest ever transshipment of oil.

The transfer of the 250 000-ton oil load had been thwarted by weather conditions in the past two days. But at 5 am this morning, in ideal weather conditions, the battle began. It ended exactly two hours and ten minutes later, with the British tanker, Litiopa, safely double-banked against the Venoil.

Oil was expected to start flowing from the 331 000-ton Venoil into the 33 500-ton Litiopa at midday today, vice-president of Venoil Incorporated, said.

"We are hoping to empty the Venoil in 36 to 48 hours, but this depends on weather conditions. The project is dangerous. We have one Kuswag circling the tankers at all times. Two more are on standby," he said.

SURVEY

The tankers were being held by the tug Wolraad Woltemade as well as by the Venoil's anchor. The tug Agulhas was also on standby at the ships.

The two harbour tugs, the Kobus Laubscher and the P J Conradie, had helped in the intricate manoeuvre and then returned to harbour. They were on call in case of a crisis, said Mr Kerr.

After the Venoil had been emptied, a survey would be made of the damage. Temporary repairs would be made before taking the ship to a repair port.

New Codes Urged

Johannesburg THE STAR in English 3 Jan 78 p 12

[Editorial: "Oiled Beaches--It Could Have Been Worse"]

[Text]

THE heavy smell of oil along the blackened Cape coastline gives every reason for holiday-makers and the coastal resort industry to feel angry and frustrated. It has cost them both dearly. But whom do they blame?

The South African authorities have done all that can be reasonably expected of them.

In fact holiday-makers can blame sluggish and procrastinating international lawyers who for years have been trying to hammer out various crucial laws of the sea and yet have failed singularly in so many important areas. One of those areas includes the laying down of standards of construction of supertankers (some of which, for

example, have only one screw and are unsteerable below a certain speed) and the general conduct of some sailors who take appalling risks in host waters.

All South Africa can do is institute as quickly as possible new navigational codes to keep ships apart and well off shore; make the maximum protest about the long list of tanker incidents off our coast — and, perhaps, draw a little consolation from the fact that the pollution was "nothing" compared with what could have happened had one of the tankers been holed in the main tanks instead of the bunkers section as happened in the Venoil/Venpet incident.

Oil Transfer Delayed

Johannesburg THE STAR in English 5 Jan 78 p 3

[Text]

PORT ELIZABETH — Pumping of oil from the damaged tanker Venoil to the Litiopa had to be abandoned at 11 o'clock last night when winds gusting up to 41 knots forced the crew to disconnect the 24 pipes carrying oil between the two ships.

But by noon today three hoses had been reconnected and pumping operations restarted.

The first casualty aboard the tankers since the oil transfer began about 24 hours ago occurred early this morning when a seaman fell several metres to the deck.

He was lifted off the ship by a charter helicopter and taken to the Provincial Hospital.

Capt T Haynes, Port Captain, said the tug Wolraad Woltemade, assisted by others on standby in Algoa Bay, had carried out the difficult manoeuvring last night without incident.

Despite predictions that up to 7 000 tons of oil an hour would be transferred to the Litiopa during the operation, relatively little oil has so far been pumped into her tanks.

CSO: 5000

TROPICAL RAIN FOREST PROTECTION URGED

Kampala VOICE OF UGANDA in English 14 Dec 77 p 4

[Article by Dr E. L. Edroma: "Protecting the Future of Tropical Rain Forest for Lasting Benefit"]

[Text]

TODAY, members of the Uganda Wildlife Clubs are holding their second seminar during which they discuss one of the most important problems facing the tropical environments.

Although the tropical areas cover a large part of the world, they will confine themselves to the African humid tropics. I wish in this regard to direct attention to one of the most important problems in conservation today — the future of the tropical African rain forest. Before considering the future I intend to briefly review the past.

The tropical rain forest is the dense luxuriant evergreen forest of tropical lowlands with a rainfall of at least 200 cm a year and with no decisive dry season. It covers the tropical belt of the world. The Amazon basin, the East Indian islands, the Zaire basin and the Indonesian states are climatically suited for the rain forests.

In Africa the Zaire basin, the lowland coastal belt of West Africa and some parts of Uganda are vegetated by this old natural climax formation. For centuries much of it has no or small scatter-

ed human populations at the forest fringes and areas accessible by rivers. The few people lived by shifting agriculture, fishing, hunting and food-gathering. They exploited much less than 30 per cent of the available environmental resources. Man was an unimportant component of the ecosystem.

Historical Developments

Man started exerting modifying influence on the African tropical forest during the last one to two centuries, and his destructive mode of life became increasingly serious with the technical advances of the 19th century.

The arrival of Europeans and the import of capital and advanced technological methods from advanced countries into Africa, improvement of tropical hygiene and communications and rapid increase of indigenous populations cumulatively caused acceleration of destruction of the tropical forests.

He indiscriminately cut the trees for wood, housing, timber, and cleared and burnt the vegetation for farming, urbanisation, road construction and recently for charcoal burning.

Almost 70 per cent of Africa's virgin rain forest is cleared, and the remaining 30 per cent and the secondary forests are being felled at greater rate than ever before.

Today the virgin or primary tropical rain forest is now very small found in remote inaccessible sites. Much of what appears primary forest today are predominantly derived or secondary forests, scrub, IMPERATA grasslands, derived savanna and other vegetation types useless or of very low economic value.

These remnants of the virgin or derived forests interspersed with serial communities and farms are shrinking so fast in our time that if active corrective measures are not made to conserve them straightway, they will disappear within a fraction of our own life time.

Protection of the few relics of the primary forest is absolutely vital. We know so little about the factors operating in a classic climax rain forest. We even do not know the age of the trees in the tropical rain forests.

Few accounts exist on the secondary succession and changes in the soil under shifting cultivation. It is essential that large remaining tracts of the tropical rain forest be rigidly protected from all human interferences so that such areas will be used as controls against which studies on the modified vegetation communities can be compared.

If we leave the virgin forest to disappear they will do so forever leaving us with no standards for comparison. We shall have no trees to supply us with seeds. Removing trees from a tropical rain forest has far more serious implications on the soil chemistry and on the plant and animal populations in the area than if similar amount of felling took place in a temperate region.

As human population continues to multiply in tropical Africa, more land invariably continues to be invaded for cultivation, ranching, housing, industrialisation, construction of motor ways, airports and other forms of use. All these need both space and timber. Charcoal industry has recently expanded at alarming rate and charcoal will continue to be used as a cheap source of energy for providing power in industries for heating and for domestic use.

The old traditional shifting agriculture will gradually be abandoned and replaced by permanent both intensive and extensive monoculture type so as to yield more food for export and for feeding the large number of the indigenous people. Civilisation, technological advancement, increased industrialisation and urbanisation, and the economist's favoured notion of "economic boom" are progressing daily at the detrimental expense of the tropical rain forest. The tropical landscape is almost all becoming man-made.

The future

What is to be the future of the tropical rain forest? Greater part of the original forest areas is not only being converted into food production or other economically productive land use. The forests are cleared for the immediate short term economic use without planning and in haphazard fashion, with little or no regard to ecological considerations.

I propose here that rational land use planning where various land use practices — agriculture, wildlife conservation, forestry utilisation, ranching, urban and rural developments, etc. be harmoniously combined in their deserving proportions in the tropical landscapes. The role National Parks and other protected areas play is vitally important in the overall economic development of the tropical regions.

Protecting the relics of the forests in as large size as possible within National Parks or strictly nature or biological reserves may assure the future of these primary forests for a lasting benefit and enjoyment for mankind.

The wonderful diversity of plant and animal life in the tropical forests is the greatest part of the human [word illegible] from the economic aesthetic and scientific viewpoint.

The proposal to protect the remaining tropical forest for aesthetic consideration and natural heritage may appear unrealistic in the light of present rapid population increase and high demand on land space and forestry resources. But the option is left to all of us in the tropical countries to examine the basic causes of destroying our forests. Population explosion undoubtedly

emerges out as the single factor responsible for the menace man is causing to the tropical landscape.

As long as the rise in human population continues unchecked, the proposal I have submitted here for protecting the remains of the fragmented tropical rain forest and indeed for observing the other conservation policies are destined to irreversible failure.

The forests, the wild animals and we the people would have lost; and man would by so doing widen the grave for his eventual funeral.

All our conservation efforts will remain [words illegible] as the primary tropical rain forest has to disproportionately large extent, become a legacy of the past.

USSR

NEW ENVIRONMENTAL RESEARCH INSTITUTE AT ORENBURG

Moscow SEL'SKAYA ZHIZN' in Russian 20 Nov 77 p 4

[Article by I. Gavrilenko, SEL'SKAYA ZHIZN' correspondent, Orenburg:
"Preserve and Increase"]

[Text] In Orenburg there has been created the Scientific-Research Institute for Protection of Nature and Rational Use of Natural Resources. This is one of the first institutions of its kind in our country.

In the office of the director of the institute Corresponding Member of the USSR Academy of Sciences Aleksandr Stepanovich Khomentovskiy, interesting photographs hang on the walls. A peaceful river backwater covered with white water lilies, an endless field of wheat, birches hanging on to mountain slopes, silver tassels of leather grass, tops of pine trees stretching into the sky. All this is from around Orenburg. But there are also other landscapes here. Gay open-pit copper mines, Buruktal nickel-cobalt ores, Tyul'gan brown coal, the Orsk-Khalilovo Metallurgical Combine, Buguruslan and Buzuluk oil wells and, finally, the gigantic enterprise--the Orenburg Gas Complex with its unique gas pipeline to the western boundary of the USSR.

There is no doubt that natural resources will be used even more intensively in the future. The Soviet state, whose purpose is the fullest possible satisfaction of the growing needs of the people, requires a powerful economy, a developed national economy. But this does not at all mean that this problem can be solved with any sort of means. Quite the contrary, it is stated outright in the new USSR Constitution that in the name of the interests of the present and future generations all necessary measures must be taken for the protection and rational use of natural resources and improvement of man's environment. The work of the recently created institute is dedicated to questions helping to solve these difficult problems.

"Our institute," Aleksandr Stepanovich told us, "grew out of the laboratory for protection of nature and rational use of natural resources attached to the Department of Engineering Geology and Geodesy of Orenburg Polytechnic

Institute. We work on a cost-accounting contract basis. The purpose of our activity is to conduct broad scientific research in the region of the South Urals and Northwestern Kazakhstan, on which basis it becomes possible to give a most precise appraisal of the region's natural resources.

"We would like the natural conservation side of the matter to receive full rights of citizenship. This applies first of all to the basin of the Ural River.

"For the same reason tremendously rich unutilized opportunities remain in agriculture in the form of land requiring irrigation. Taking this into account, on the basis of a contract with the USSR Ministry of Land Reclamation and Water Resources, we started on the development and scientific demonstration of measures for bringing back the river to a robust and sound life. In particular, staff members of the institute are working on a project for replenishing the Ural River with water supplied by way of a branch extending from the Ob'-Caspian Canal. This branch has to go through the Turgay Hollow, which will not require large capital investment.

"The institute has conducted four expeditions to choose a route for the canal. In case of approval of the developed project, Orenburgskaya, Kustanayskaya, Aktyubinskaya and Ural'skaya oblasts will receive water for about 2 million hectares of presently arid land. This is a very major problem on which we are working. And there are others. Orenburgskaya Oblast has about 100,000 hectares of sand. Today a part of this land is occupied by extremely sparse pasturages and hay mowing areas, the inefficient use of which can do serious damage to nature in the future. How can these lands be improved and how can their economic payoff be made more significant? The answers to these questions can be obtained only by carrying out a comprehensive study of each sandy area, its vegetative cover, humidification and fauna. Only after this will it be possible to give a scientifically based recommendation for the basic improvement of sandy areas.

"At the present time, we have concluded contracts with the grain growers of Kolkhoz imeni Ilich of Orenburgskiy Rayon and Druzhba Kolkhoz of Sol'-Iletskiy Rayon. We helped the first farm to solve the problem of providing water and irrigating the land through the construction of five dams and the second through developing measures for dealing with sand.

"And do not the unique monuments of nature and disappearing natural landscapes need to be studied, protected and put to best use? There are many such monuments on the territory of the oblast. There is the remarkable Buzuluk Bor [pine forest] and the Shubargash forest retreat in the south of the oblast. Unfortunately, modern forest use provides only systematic, step-by-step felling of them. This is being done, it would appear, with the good intention of replacing them with a young forest cover of more valuable timber stands. But at the same time it is forgotten that the surviving stands created by nature itself preserve the keys to the creation of a protection of the fields here from drought and hot dry winds. The thoughtless plowing of the

land has inflicted damage to the genetic fund of steppe plants, which could be useful in developing new agricultural crops in the future.

"The local fauna has likewise been damaged. It is essential to create preserve protective conditions for individual parts of the steppe. We are now studying a rather well-preserved sector of the southern steppe in the Guberskiye Mountains. We are going to strive for the creation of a preserve there. In our work, we depend on help from soviet and operational organs, on joint efforts of representatives of science and production.

"Orenburg land retains many traces of barbaric treatment of it in the past. Like smallpox, large territories have been dug up in Oktyabr'skiy Rayon, where in the ancient past and later copper was obtained in a primitive way. Recovery methods are changed today, but piles from underground workings and pits from abandoned quarries remain. What should be done with them? The institute has developed several plans for the recultivation of such land.

"For doing work on transformation of land, specialists are needed. Scientists have pleaded concerning the need of training engineers for dealing with protection and rational use of natural resources. This request has received the support of a number of ministries, but the question has not been resolved decisively.

"The institute is gathering strength. But its operation is a genuine reflection of those efforts which are expended by the state for the protection of the environment and thrifty use of land, water resources, vegetable and animal kingdoms of the country in the name of the future."

7697
CSO: 5000

ENVIRONMENTAL EXHIBITION IN TBILISI

Moscow PRAVDA in Russian 24 Oct 77 p 4

[Article by G. Lebanidze, correspondent: "Taking Care of the Future"]

[Text] The Sports Palace has become a huge exhibition hall. The exposition "Rational Use and Conservation of Natural Resources of the USSR" has opened here.

On exhibit is the Soviet Union's wide participation in international measures for environmental conservation. Our country's signature has been put on conventions and agreements with fifty governments.

The maps and diagrams tell about the huge projects in our country devoted to environmental protection. By 1980 the Soviet Union will have 135 preserves, amounting to 354,000 hectares of windbreak bands. Displayed are new models for monitoring instruments, mock-ups of scrubbing equipment for chemical, petroleum processing, and mining industries. Visitors will become acquainted with the method used at the Zaporozhskiy Auto Plant. Waste water is cleansed of harmful substances by microorganisms there.

Special attention is given to measures against air pollution. Our country was the first to establish standards for permissible levels of harmful substances in the air. On display are plans for gas scrubbers and dust traps for industry.

In front of us are new types of cars which considerably lower air pollution by carbon dioxide. An example is the large city bus from the Likino Auto Plant which runs on bottled gas and cuts air pollution by six to eight times. The ZIL-138-G operates on liquefied gas. There is also a test model Volga which uses liquefied gas and ordinary gasoline.

A lot of interest has been stimulated by exhibits on resource conservation on the surface and within the earth. An example: a hectare of forest can remove the dust and harmful material from 18 million cubic meters of air in one year. Exhibits demonstrate ways to protect forests from fires and pests.

All union republics have contributed films to the exhibition.

9002
CSO: 5000

USSR

MEAT, DIARY INDUSTRY CONFERENCE IN THE ENVIRONMENT

Vil'nyus SOVETSKAYA LITVA in Russian 13 Oct 77 p 3

[Article datelined Alitus, 12 october (EL'TA): "To Improve Environmental Conservation"]

[Text] Today marked the conclusion of the three-day All-Union Scientific-Practical Conference on Problems of Environmental Protection at Enterprises of the Meat and Milk Industries of the USSR. Noting its work, the Deputy of the Ministry of the Meat and Milk Industries of the Lithuanian SSR, P. Petrauskas told the following to the EL'TA correspondent:

"Representatives of the Scientific establishment of the Ministries of the Meat and Milk Industries of all union republics at the conference discussed progressive ways to protect the environment at enterprises of the meat and milk industry of our country, considered new projects of scientists and their proposals. Guests visited enterprises at Alitus, Kaunas, and Kibartai.

Great attention is given to environmental conservation at the meat and milk industries of the republic. Reliable equipment for biological and chemical water purification has been installed at the Alitus, Panevezhskiy, and Utena Meat Combine and other enterprises. A powerful "economy of purity" has been created at the city of Taurag. Improved purification of water used in manufacture and for protecting reservoirs from pollution has been aided greatly by collectives of the republic's industries, of specialists of the Kaunas Polytechnical Institute im. Antanas Snieckus and the Lithuanian branch of the All-Union Scientific Research Institute of the Butter and Cheese Industry.

The recommendations adopted at the conference proposed that the enterprises of the Meat and Milk Industries of our country incorporate rapidly a recycling system for water purification.

9002
CSO: 5000

CONTINUED EMPHASIS ON ENVIRONMENTAL PROTECTION NOTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 46, Nov 77 p 15

Article: "Concern over Protecting Nature"

Text In the interest of present and future generations the necessary steps are being taken in the USSR for protecting and utilizing on a scientific and rational basis the land and its underground wealth, water resources, and plant and animal life, as well as for maintaining uncontaminated air and water supplies, ensuring the regeneration of natural resources, and improving man's environment.

Article 18, USSR Constitution

The day after the October revolution the Second Congress of Soviets adopted the historical Land Decree. Since that time all land and natural resources have been the property of the state and are protected by law as national property.

During the period of Soviet rule a great deal of work has been accomplished on safeguarding our land, underground resources, forests, water and fishery resources, and atmosphere, as well as on the efficient utilization of our natural wealth. Approximately 11 billion rubles have been allocated for these purposes in the 10th Five-Year Plan.

A network of state and public organizations has been set up in our country for protecting the surrounding environment. The primary institutions, organizations and enterprises involved in the development and manufacture of gas- and water-treatment equipment have been established. Departments for protecting and monitoring healthy conditions for the land, water and air are now functioning. Strict norms delimiting permissible concentrations of harmful wastes in the atmosphere and bodies of water have been established.

At the Third All-Union Congress of Kolkhoz Workers L. I. Brezhnev said, "We must take a long look at our land areas, and uncompromisingly and prudently approach the allocation of land for construction of enterprises, which, of course we must build. At the same time we must be sure that we do not reduce, but constantly increase, the area of productive land."

The "Principles of land legislation in the USSR and union republics" adopted by the Supreme Soviet USSR increased the demands placed on all land-users and required enterprises and organizations to carry out the recultivation of temporarily occupied lands and return them to agricultural purposes as farm land and other types of arable land.

The protection of land resources and a rise in their productivity are the most important portion of the state plan for development of the national economy. To do this a series of measures is being implemented for protecting the land from erosion and mud-filled torrents by creating forested windbreaks, terracing on steep slopes, etc., constructing anti-erosion and anti-flood structures, and implementing agro-technical measures on a broad scale. Some 85,000 h of land will be recultivated this year, and in 1978 the figure will be 90,000 h. For a comparison, remember that in 1975 a little more than 30,000 h of land were rehabilitated.

Reclamation is the main factor in raising land productivity. Reclaimed lands provide a significant portion of our agricultural production.

In April 1974 the Central Committee CPSU and Council of Ministers USSR signed the decree "Measures for further developing agriculture in the non-chernozem zone of the RSFSR." In this document were specified a large number of measures for the fullest and most effective use of arable land. Including reclamation. Work on the reclamation of all agriculturally useful land is scheduled for completion by 1990. A total of 9-10 million h will be drained.

In order that our timber resources will not decline but actually increase, reforestation is being performed on a large scale in areas which have been cut, and tree belts are being created in dry, steppe, and sparsely forested areas.

In the 10th Five-Year Plan reforestation work will be conducted on over 10 million h of state forest reserves. Some 320,000 h of forested windbreaks will be planted.

In June 1977 the sixth session of the Supreme Soviet USSR approved the "Principles of timber legislation in the USSR and union republics" and signed the decree "Measures for further improving the protection of forests and the efficient use of timber resources." According to this decree the State Committee for Forestry, together with other concerned ministries and departments, is obliged to expand, making use of the latest scientific and technological advances, and implement measures for preserving forests, raising their productivity, and improving the quality of reforestation work.

In our country great importance is being attached to the development of forest reserves. They play a major role as "bastions of nature," as areas for monitoring the state of the biosphere, and as places for the protection and reproduction of a variety of plant and animal organisms.

The creation of a more efficient and scientifically based network of forest reserves has been planned for the country. Last year 120 reserves existed in

the country, and in 1980 the number will be over 135. The "USSR Red Book" was introduced and contains all the endangered animal and plant species which come under special protection. A plan has been worked out and is being implemented for protecting our underground wealth and efficiently using mineral resources.

Water is one of our most valuable natural resources. It is widely used both in industrial production and everyday activities. With the growth in the material and cultural level of residents of cities and towns, as well as with the development of a centralized water supply for municipal services departments, hospital facilities, etc., the requirement for water to meet industrial and residential needs will rise significantly in the 10th Five-Year Plan. Also the consumption of water in the agricultural sector will increase for improving the living conditions among the rural populace, developing livestock raising, and irrigating land. As a whole it will increase by 33 percent over 1975 figures by 1980.

The "Principles of water legislation in the USSR and union republics," approved by the Supreme Soviet USSR in 1970, forbids the introduction of any enterprise into operation which is not equipped with facilities for treatment of waste water. The law requires the heads of enterprises, institutions and organizations to take steps toward reducing water consumption and preventing the dumping of polluted waste water by using the latest scientific-technical methods.

Treatment facilities with a total capacity of approximately 50 million cubic meters of waste water per day are specified for introduction during 1978-1980.

A large amount of work for preventing pollution in the basins of the Black, Azov, and Baltic seas, Lake Baikal, the Volga and Don rivers, and other areas with non-treated water waste has been scheduled through special party and governmental decrees.

The primary ways of avoiding atmospheric pollution include a scientifically based siting of enterprises, the development of industrial technologies which eliminate harmful discharges, and the creation of effective methods of treating gases and healthful tree and shrub zones.

Substantial efforts are being made to protect the atmosphere. The sizes of input capacities for gas-treatment and dust-removal equipment, as well as the quantity of trapped substances from stationary installations, are being planned for sectors of industry. Last year approximately 160 million tons of harmful discharges from waste gases were collected by special equipment at enterprises throughout the country.

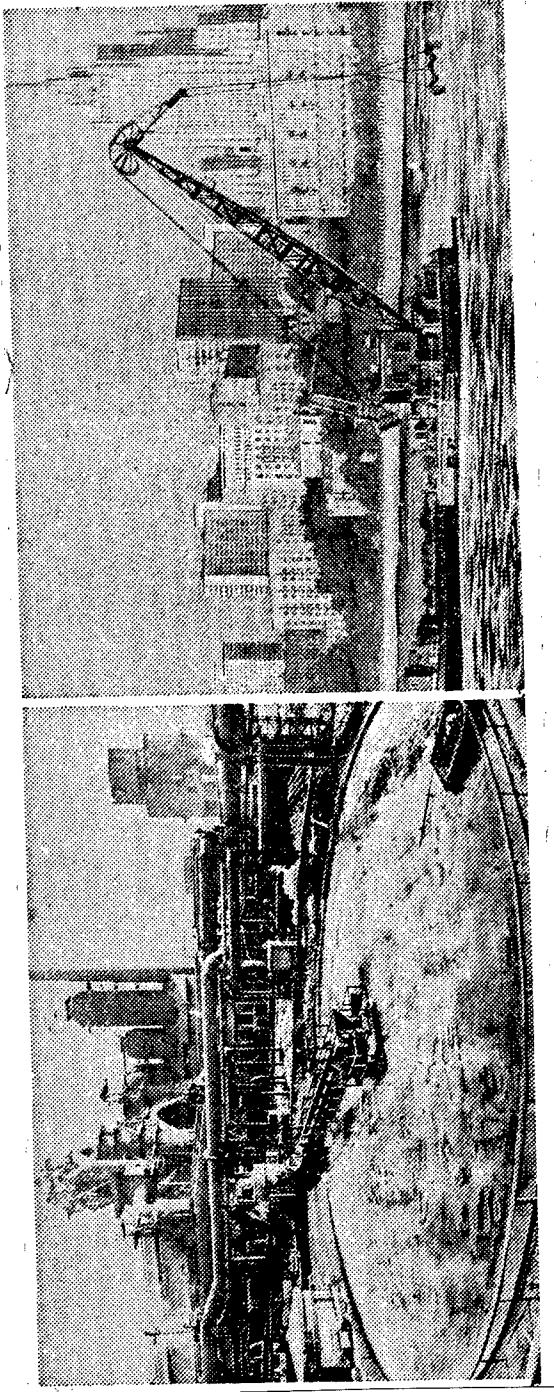
Special filters and other equipment which protect the adjacent atmosphere from pollution are being used at thermal-electric power stations, cement plants, ferrous and non-ferrous metallurgical enterprises, and in other industrial sectors.

The introduction of non-waste technologies at industrial enterprises is taking on more and more significance. They will allow the utilizing and reprocessing of production wastes which in the past were taken to dumps or released into the atmosphere. In these types of operations we benefit both ecologically and economically.

A special decree of the Central Committee CPSU and Council of Ministers USSR concerning the better protection of mother nature's wealth contains a large number of measures directed at protecting the environment from pollution and efficiently utilizing our natural resources. Specific tasks have been set down for a number of ministries and departments. They include the accelerated production of equipment, products, and materials needed for creating and operating highly-efficient treatment facilities at enterprises and in cities.

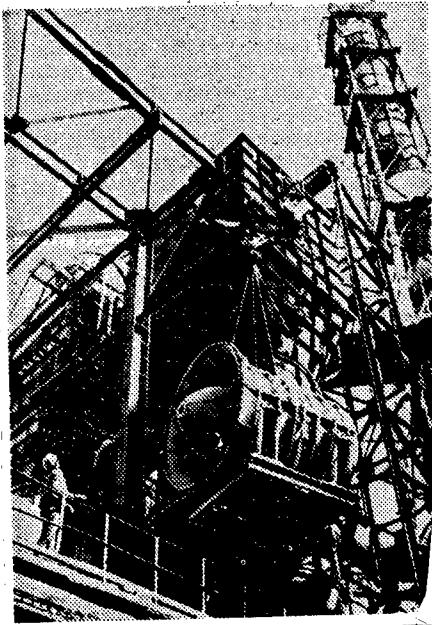


In Kirgizia tree plantings are made annually on an area of approximately 6,000 h. The photograph pictures two of the leading foresters in the republic--A. Kamchibekov and Sh. Asangel'diyev.

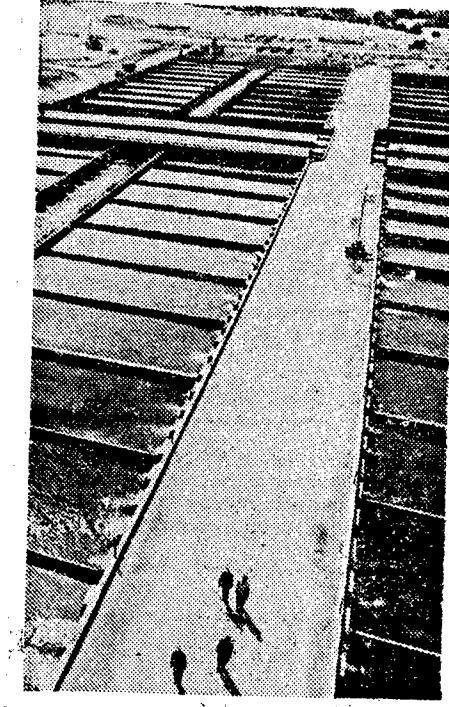


Considerable attention is being given to the treatment of waste water at the Nizhniy Tagil Metallurgical Combine imeni V. I. Lenin. The photograph shows the enterprise's water treatment facility.

Extensive work is being conducted on dredging the Moscow River in accordance with the new General Plan for the development of Moscow. As a result the oxygen content in the water has been increased; and more fish are in the river flowing through the city.



In the electrolysis facility, now under construction at the Tadzhik Aluminum Plant, a blower has been installed which weighs 20 tons and has a capacity of 150 cubic meters of air per second. The photograph shows the blower which is located in the gas-treatment shop.



A fishery exists at the Zaporozhets GRES. Carp are raised in ponds which are filled with the treated hot water from the electric power station. The photograph shows a portion of the fishery.

6754
CSO: 5000

KHAR'KOV CONFERENCE FOCUSES ON POLLUTION FROM VEHICLE EMISSIONS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Oct 77 p 4

[Article by R. Akhmetov, TASS correspondent: "Car and City"]

[Text] During the last quarter century the world's total number of automobiles has approached three hundred million. The accumulation of gasoline vehicles in cities produces air pollution and noise pollution. This is why the search is on in many countries for "clean" engines.

The problems of protecting the atmosphere from pollution by toxic emissions from vehicles was the focus of the All-Union Scientific Conference in Khar'kov. It was organized by the AS USSR and the Ukrainian SSR in conjunction with the Institute for the Problems of Auto Construction of the AS Ukrainian SSR. Specialists, including representatives from large automobile plants, discussed ways to improve the construction of various types of cars. What are the directions of scientific research?

Scholars from Moscow, Yerevan, and Kaliningrad are working on a principally new form of vehicle: an electric car that operates on batteries. According to many specialists, in time it will essentially replace the ordinary car, ridding the city of exhaust gases and noise. Test runs have already begun. True, their range does not yet exceed 100 km without recharging. Therefore other models are being developed. Particularly, a hybrid electric car with a combined engine system is being worked on: a small internal combustion engine charges the batteries while in motion. This model has a range comparable to conventional automobiles.

Another promising form of transportation is now being road tested: a gas turbine truck. It is built by the Gor'kiy Automobile Plant in cooperation with the Yaroslavskiy Engine Plant. The turbine's advantages include a service period measured in hundreds of thousands of kilometers, insignificant running costs, as compared to the internal combustion engine, plus it permits a decrease in toxicity by tens of times.

Specialists are also interested in technological innovations which appeared at the dawn of the automobile age. Particularly, the engine invented in the last century by the Englishman Sterling, which did not find application then, just might become the "heart" of the car of the near future. From an ecological viewpoint it is irreproachable: it is clean, noiseless, and can run on any fuel, including nuclear. However, due to its bulky size, low power, and complex control, the Sterling engine did not become popular. The leading car manufacturers of the US are working on improving it. Moscow Higher Technical School im. N. E. Bauman and the Moscow Highway Institute are also working in this direction. Many complex technical problems must be solved to make the engine compact, powerful, and easy to control.

At the same time, the efforts continue to replace gasoline with a less toxic fuel. Fundamental research is underway on the use of hydrogen and a hydrogen-gasoline mixture as an automobile fuel at the Institute of Physical Chemistry of the AS USSR and the Institute of Problems of Automobile Construction of the AS USSR. Compared to gasoline, hydrogen is a clean fuel: its combustion product is water. According to scholars, in the near future it will be used widely in automobile transport, energy generation, and metallurgy.

Another effective way to lower the toxicity of exhaust gases is to convert vehicles to liquefied natural gas (propane-butane). The exhaust of such cars contains a fourth as much carbon monoxide. The "Chief Directions for Development of the Economy of the USSR in 1976-1980" sets the task of expanding production of bottle-gas driven cars for large cities. In Moscow, Omsk, and the Kuzbass, thousands of trucks can be seen with gas tanks replaced by the orange gas cylinders. Light taxis and buses are undergoing tests with natural gas. Mass production will be set up at the auto plants in Gor'kiy, L'vov, and Likino.

As noted at the conference, research and manufacturing projects on decreasing toxic exhaust gases is also taking other directions. The future will show which ways are the most promising.

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WATER POLLUTION CONTROL

Tbilisi ZARYA VOSTOKA in Russian 27 Nov 77 p 1

Article: "Clean Rivers" 7

Text From the earliest times people knew: where there is a river, there is life. The river both gave man to drink and fed him, with the herbage from its shores it treated his physical ailments.

It is truly difficult to overestimate the ecological, economic and social significance of rivers. But this resource is not inexhaustible, and it is necessary to use it efficiently and prudently, so that rivers would grant both us and future generations courage and health. Such a prudent attitude toward nature is taught by the decrees adopted last year: that of the CC CPSU and USSR Council of Ministers, "On Measures To Prevent the Pollution of the Basins of the Black and Azov Seas," and that of the USSR Council of Ministers, "On Measures To Increase the Protection of the Baltic Sea Basin From Pollution."

How great an importance is ascribed in our country to environmental protection and the planned use of the generous gifts of nature, can also be judged by the fact that at the Sixth Session, Ninth Convocation, of the USSR Supreme Soviet, along with other questions, there was also examined the question of measures on the further improvement of the conservation of forests and the efficient use of timber resources and of the draft of the Fundamentals of Forest Legislation.

The state is also showing great concern about the cleanliness of river basins. A special state service of fish protection, which is equipped with the latest equipment, is operating in our country, great assets are allocated annually for replenishing the fish resources of seas and rivers.

Where the local party and soviet organizations and the collectives of industrial enterprises, construction projects, kolkhozes and sovkhozes are constantly concerned about protecting the cleanliness of rivers, their fish stocks are not thinning out but, on the contrary, are increasing.

In recent years in our republic much work has been done to purify the waste water being discharged into the rivers. Purification facilities with a capacity of 68,000 m³ a day have been built in the region of Gagra, Pitsunda and the Bzybi industrial center, including 12,600 m³ with complete biological purification. This made it possible to maintain at the proper sanitary level the purity of the water of the Bzybi River and prevented in this region the pollution of the Black Sea by industrial wastes.

Purification facilities are also operating efficiently at the Gamardzhvebskiy Poultry Factory.

Purification facilities with a capacity of 1,500 m³ a day are planned at the meat combine under construction in Gachiani, which is being equipped according to the latest word of science and technology.

Two large industrial centers of the republic--Tbilisi and Rustavi--in the near future will have unified general purification facilities with the complete biological reduction of the waters being discharged into the Kura.

All these are specific examples of the fulfillment of the extensive program of measures outlined by the 25th CPSU Congress on environmental protection. Much has been done today in this direction, but even more remains to be done. The local soviets, the sanitary inspectorate, the Georgian SSR Committee for Nature Conservation, Gruzcherrybvod and Gruzrybprom should attempt more persistently to see to it that facilities for the purification of industrial and municipal wastes are built and properly operated in each city. The duty of the workers of agriculture and forestry is to adhere strictly to the regulations of the use of toxic chemicals and use chemical fertilizers competently.

Unfortunately, not everywhere yet are party, soviet and economic managers dealing with the proper responsibility with protecting the cleanliness of river basins. An especially unfavorable situation in this respect has formed in the city of Rustavi, three enterprises of which--the metallurgical plant, the chemical fiber plant and the chemical plant--are constantly creating the threat of contaminating the Kura with harmful substances.

Thus, last year 183,216 rubles of fines were exacted from the Rustavi Chemical Plant for the harm done by it to the fish resources of the Kura by discharging into it production wastes which had not undergone proper purification. Gruzcherrybvod in November of last year sent the materials on this case to the Prosecutor's Office of the Georgian SSR, however, those directly at fault for the caused harm have thus far not been called to account. Such "indecisiveness" of administrative organs can in no way be justified.

This year the Georgian SSR Committee for Nature Conservation twice indicated to the administration of the by-product coke shop of the Rustavi Metallurgical Plant the need to intensify the control over the operation of units for

the purpose of preventing the discharge of harmful substances into the Kura. A fine was also imposed on D. Garmiza, the deputy chief of the by-product coke shop, through whose fault the discharge of harmful substances into the Kura occurred. However, these measures did not have the proper effect, the management of the shop and the enterprise did not draw the proper conclusions from them. This had the result that a large amount of harmful substances was discharged into the Kura as a result of the negligent attitude of A. Mamulashvili, the chief of the by-product coke shop, toward his duties.

It is extremely incorrect to be reconciled with such cases of a criminal attitude toward nature and to be confined only to fines. The duty and obligation of party, soviet and administrative organs are to take the severest measures in cases of the pollution of reservoirs so that these cases would not be repeated in the future.

In the new USSR Constitution it is noted that the land, its mineral resources, waters and forests are the exclusive property of the state. "In the interests of the present and future generations," it is stated in it, "in the USSR the necessary measures are being taken for the protection and scientifically substantiated, efficient utilization of the land and its mineral resources, water resources, the plant and animal kingdom, for keeping the air and water clean, ensuring the reproduction of natural resources and improving man's environment." Party, soviet and economic organs and all the workers are obliged to contribute to the implementation of this law, which is aimed at the protection and increase of the natural resources of our homeland.

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DEVELOPMENT OF INDUSTRIAL WATER SUPPLY SYSTEMS IN MOSCOW

Moscow GORODSKOYE KHOZYAYSTVO MOSKVY in Russian No 6, Jun 77 pp 28-30

[Article by A.S. Matrosov, chief of the Administration of Water Supply and Sewerage Management of the Executive Committee of Moscow City Soviet, and B.I. Yakovlev, chief of a department of Mosvodoprovod Trust: "Ways of Developing Industrial Water Supply"]

[Text] The "Basic Directions of Development of the National Economy for 1976-1980" include set tasks among others requiring special measures for protection of the environment, comprehensive and rational use of water resources. They are particularly urgent for Moscow where industry at the present time consumes 27.8 percent of the drinking water supplied to the city.

It should be noted, however, that in comparison with other cities and the RSFSR as a whole this indicator is somewhat lower. Thus, in Leningrad, it is equal to 33.8 percent, Novosibirsk--31.3 percent, while in the republic, industrial water consumption amounts to 32.9 percent. This marked relative reduction has come about in the last decade due to the implementation of a series of measures on regulation and rational use of water resources.

For economy of drinking water in industry, in conformity with an implemented technical policy, artesian wells were drilled, limits were placed on the release of the city's water supply, recommendations were made for construction of systems involving recycled use, group cooperation of industrial enterprises was carried out, using standard pure water, and in recent years construction has been going on of industrial water supply systems. Each of the enumerated ways at one time played a positive role in dealing with economy of drinking water, but not all of them can be recommended today. A striking confirmation of this is the situation in the city existing at the present time with respect to artesian wells.

In the history of the capital's artesian water supply, periods can be found which differ one from the other by the degree of attention paid by industrial enterprises and specialists to artesian water. The appearance of wells in districts with a weakly developed network of centralized water supply and in areas where such was completely absent constitute the basic reason for the increased water removal from underground water tables at the beginning of the fifties. This period is characterized by the appearance of powerful

artesian installations with a productivity of tens of thousands cubic meters daily--for example, at Zamoskvorech'ye, Pokrovsk-Streshnev, on the grounds of the Plant imeni Likhachev and at other places.

In the beginning of the sixties, a sharp growth was observed in well drilling. By 1965 their number, compared to 1959, had almost doubled, and water removal through them amounted to 500,000 m³/day. This was the result of a significant expansion of the city's limits, as a consequence of which its boundaries were found to contain districts with weakly developed engineering communications.

A significant role has been played by efforts to economize on drinking water. A large number of industrial enterprises were requested to drill artesian wells without delay and to reduce consumption of water from the city system.

At the same time, weak geological control, absence of data on permissible removal from artesian wells according to city districts results in intensive lowering of water table levels. During this period the hydrogeological, sanitary and other services were faced with problems whose solution is also characteristic for the present time. In 1970, reserves of artesian water were set, as well as its permissible withdrawal from the region of Moscow and the forest park protective belt. The developed document set the maximum possible magnitude pumping out of artesian water within the limits of the Moscow auto beltway. By this time, industrial, administrative-public, entertainment enterprises and organizations, as well as the Moscow water supply services were taking considerably more artesian water. The set task determined the technical policy in regard to this question for the next 5 years. The present period is characterized by sharp curtailment of drilling of new wells within the confines of the city and transfer of wells belonging to the Moscow water supply system to a reserve in connection with the developed of systems of centralized water supply in the peripheral districts of the city.

But limitation of the drilling of new artesian wells has not solved completely problems of stabilization of water table levels, which makes it necessary to search for other forms. The difficulty lies in the fact that artesian water is used as a cooling agent in manufacturing processes of industrial enterprises. Maintaining a constant low temperature (8-9°C), it is a most economic source for cooling equipment. Curtailment of withdrawal of artesian water within city limits will require providing the sites of industrial enterprises 2-2.5 times more drinking water, because in summertime its temperature is 20-22°C.

Naturally, neither economic interest nor technical possibility for such a scheme by the Moscow water supply system ever existed or exist at the present time. Reduction of the removal of water on the scale indicated in the general scheme of Moscow's water supply is only possible through the use of water of industrial quality. It is namely this, as well as the sharp growth of heat and power needs, wide-scale introduction of cultural, domestic and industrial air-conditioning systems, provision of water to decorative ponds and water bodies that have made it necessary to create an industrial water supply.

In the immediate years ahead, water expenditure will grow to 50,000 m³/day at the Serp i Molot Plant, while the tire plant and the GPZ-1* will each require 10,000-12,000 m³/day. For the TETs-25, -23 and the branch of the TETs-9 now under construction or renovation will require a total of 300,000 m³/day. Moreover, 10,000 m³/day will be needed for the air conditioning of the Olympic complex at Izmaylovo. Moscow has not had so far such great water users. Furthermore, traditional solutions are frequently unsuitable because of architectural, urban-development and sanitary requirements. The water supply of modernized industrial enterprises based on recycling systems is not always possible because of the absence in those parts of the city of free land for locating cooling towers, capacities, pumping stations. Therefore the only possible source for provision of technological needs of enterprises is that of centralized systems of industrial water supply.

Such a solution is not new. Some enterprises, located close to Moscow River, Yauza, Setun', as well as the majority of the TETs stations of the city have long been using water of surface sources for their technological needs. At the present time, about 20 enterprises have their own water intakes, which provide more than 240,000 m³/day of industrial quality water (excluding the Mosenergo TETs). The aforementioned installations are local, that is, they supply industrial water only to that enterprise under whose operation they are located. The imperfection of water intakes of this kind is obvious.

The ispolkom of the Moscow City Soviet has set a task for the Administration of Water Supply and Sewerage Management the task of creating centralized industrial water supply systems with the maximum possible encompassing of enterprises coming within the zone of operation of each such system. During 1967-1970 the administration worked out, and the ispolkom of Moscow City Soviet approved the engineering tasks for the planning of the Kuntsevskaya, Southeastern and Cherkizovskaya industrial water supply systems. Their construction started in 1973.

The first of them, with a capacity of 350,000 m³/day and a water intake from Moscow River, is to supply industrial water to the TETs-25 of Mosenergo and the industrial enterprises located in the industrial zones of Kuntsevo-Ochakovo and Oktyabr'skoye Pole. The project includes the following structures: water intake, pumping station with six units, chlorinating facility, two water mains with a total length of 73.4 km. The estimated construction cost is 12.2 million rubles.

In 1975 the Mosinzhproyekt Institute "Plan for an Industrial Water Supply System in the Area of Kuntsevo-Ochakovo," providing for the construction of conducting networks, in accordance with which it will be necessary to construct about 10 km of distribution lines with the funds of enterprises designated for a changeover to an industrial water supply.

The Cherkizovskiy industrial water conduit will provide water for the TETs-23, a number of enterprises, a hotel complex at Izmaylovo and other facilities located in the areas of Cherkizovo, Izmaylovo and Gol'yanovo. The range of structures is comparable to the Kuntsevo arrangement, the length of the water lines to the TETs-23--38.6 km, estimated construction cost--13.3 million

rubles. It is expected that this system will go into operation this year. According to the plan also worked out by the Mosinzhproyekt, it will be necessary to build 25 km of conducting of conducting grids.

The Southeastern System employs for its source prepurified sewage water of the Kur'yanovskaya aeration station. We would like to dwell particularly on a characterization of this system. The fact is that the surface sources of water supply existing today for the city have practically been exhausted. For this reason it is not possible to count on the continued growth of the numbers and capacities of industrial water supply systems based on them--at least not before bringing in new water sources or providing for a significant increase in the yield of existing ones. Both one and the other would require large capital investments. Under such conditions, the use of prepurified sewage water of Kur'yanovskaya aeration station located in relative proximity to areas with a highly developed industry would be a most acceptable solution of the problem of providing water for the technological needs of industry. Unfortunately, the almost complete absence of research work on the use of prepurified sewage water and coordination of the field of use by sanitary protection organs present a contradictory and extremely cautious character. The history of planning, construction and operation of the Southeastern System is an example of absence of a comprehensive scientific-technical approach to adoption of progressive forms of industrial water supply.

The engineering assignment worked out by the Administration of Water Supply and Sewerage System Management for the planning of the Southeastern Industrial Water Supply provided for the use of prepurified water in the technological processes of the branch of TETS-9, as well as tens of industrial enterprises. By that time there was the conclusion of the Moscow branch of the Central Boiler and Turbine Institute imeni Polzunov on the feasibility of using prepurified water at heat and electric power stations, as well as an agreement by operational services of enterprises for the use of prepurified water from the Kur'yanovskaya aeration station in place of drinking water in heat exchangers.

In 1975 the Southeastern Industrial Water Supply System went into operation. Its first users were the Motor Vehicle Plant imeni Leninskiy Komsomol and the Kleytuk Plant. The branch of the TETS-9, despite the fact that its reconstruction plan provided for the use of industrial water from the Southeastern System, up to the present time has instituted no measures for receiving prepurified water, preferring a most unreliable source of water supply. The reasons include lack of installations for recycling water and also the groundless fear of a negative effect of the Kur'yanovskaya water on the technological equipment. And this is at a time when the VODGEO* Institute has carried out scientific-research work, resulting in the recommendation of use of prepurified sewage water for feeding recycling systems. The same work, and with the same conclusions, was performed by the VODGEO Institute directly at the branch of TETS-9. As a result, the pumping station of the Southeastern Industrial Water Supply System, designed for a productivity of 200,000 m³/day, is supplying at the present time slightly more than 20,000 m³/day.

*VODGEO = All-Union Scientific-Research Institute of Water Supply, Sewerage, Hydroengineering Structures and Engineering Hydrogeology.

But despite the difficulties, the Southeastern System is picking up force. A decision of the ispolkom of the Moscow City Soviet provides for construction in 1977 of 7.2 km of conducting grids, which will permit supplying industrial water to such larger user plants as Serp i Molot, GPZ-1, tire plant and others.

The work of introducing industrial water supply systems is not limited to the three described systems. The general plan for Moscow's water supply, approved by the ispolkom of the Moscow City Soviet, provides for increasing the capacities of industrial water supply systems. Over the long run, the construction of 26 centralized systems is planned. The largest of them are the Pirogovskaya, Luzhnikovskaya, Filevskaya. In 1977, the Institute of the General Plan of the City of Moscow, jointly with the Moscow Institute for Planning of Engineering Installations will begin making working plans. The second section of the Southeastern System is in the developmental stage, providing for an increase of its productivity to 400,000 m³/day.

In conclusion, it should be noted that the general plan of water supply for Moscow provides for high rates of development for industrial water supply systems both on the basis of open sources and also on the basis of purified sewage water. The general plan specifies that capital outlays for supplying one cubic meter of industrial water amount to 25 rubles versus 120 rubles for drinking water. The cost of one cubic meter of industrial water amounts to 1-1.5 kopecks and of drinking water--4 kopecks.

Use of industrial water will bring many benefits to industrial enterprises. As we know, as of 1 January 1977, a new rate was introduced for them: one cubic meter of drinking water now costs 15 kopecks. The wholesale price of one cubic meter of water from the Southeastern System is 3 kopecks. Economic managers should pay attention to this and apply maximum efforts for timely preparation of enterprises to transfer to the economical industrial water supply.

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USSR

UDC 628.19

CLEANING UP YAUZA RIVER

Moscow GORODSKOYE KHOZYAYSTVO MOSKVY in Russian No 6, Jun 77 pp 31-33

[Article by M.A. Snetkov, senior engineer, N.A. Plekhanov, junior scientific associate of the Institute of Water Problems of the USSR Academy of Sciences: "The Yauza Is Going To Be Cleaner"]

[Text] The problem of protecting the environment is the object of constant concern of the Communist Party and the Soviet state. This thought was heard again in the Summary Report of the CC CPSU to the 25th party congress, enunciated by General Secretary CC CPSU Comrade Leonid Il'ich Brezhnev: "... with the development of the national economy, growth of cities and industrial centers, increasingly more capital will be required for the preservation of the environment--in this five-year plan, 11 billion rubles will be allocated for these purposes."

In recent years a whole series of documents has been adopted, aimed at the rational use of natural complexes of large economic regions. The contents of many decrees (on the wise use of natural resources of Lake Baykal and its adjoining territories, on protection of the basins of the Volga and Ural rivers, on prevention of pollution of the Caspian, Black, Azov and Baltic seas, on dealing with soil erosion, on the development of agriculture of the Nonchernozem Region and many others) testify to the unflagging struggle for cleanliness and safety of the environment--water bodies, soils and atmospheric air.

In Moscow, together with solution of the main problems relating to protection of the air basin there had been placed on the agenda the problem of improving the condition of open water bodies. Here definite successes have been achieved. Following putting into operation purification installations and clearing of the bed, the main water artery of the capital--Moscow River--became significantly cleaner.

When it comes to small rivers, the matter is far from successful. The concentration of numerous enterprises of various branches of the national economy results in the pollution of these rivers. Such is the situation of the Yauza, Likhoborka, Setun' and Skhodnya.

They can be put into a special category characterized by a specific feature: the hydrologic, temperature and hydrochemical conditions of these rivers are determined not so much by the original physico-geographic characteristics of their basins as by powerful anthropogenic influences--discharges of industrial enterprises, from city territories, intensively fertilized agricultural lands, animal-husbandry complexes. The parameters of such water courses are influenced little by seasonal changes, they are rather determined by operational activity.

A significant portion of the territory of the Yauza basin is covered with water-impermeable surfacing: asphalt of streets, areas and highways. The runoff of rain and thawed water does not penetrate into the ground, which results in a sharp fluctuation of the water level of the Yauza and its tributaries, which is uncharacteristic of flat-country rivers" after a snow or intense snow thawing, their beds are quickly overfilled with water. As for the temperature of the latter, it never drops below +2°C in the lower reaches of the river. In chemical composition, the water of the Yauza differs significantly from clean or slightly polluted rivers: the content of organic substances (in terms of chemical consumption of oxygen) is as much as 300 mg/l, chlorides used during the time of winter cleaning of streets and getting into the river with snow dumping--up to 100 mg/l; sulfates (from discharges of industrial enterprises)--as much as 100 mg/l sulfates (from discharges of industrial enterprises)--up to 100 mg/l and more; petroleum products--up to several milligrams per liter, and so on.

In the city sector of the Yauza, the formation of a layer of bottom deposits has resulted in the creation of a sludgy coating of sediments, black in color, with a marked odor and dilutions from petroleum products with an average strength of 0.5-0.6 m, covering marls, loams and argillaceous soils which once lined the bottom. Laboratory examination of extracted samples produced the following results: moisture content changed within the limits of 30-40 percent, the content of organic substances was found to be equal to 28-33 percent of the dry weight of the soil. Mineral residue after calcination consisted of a sulfurous powderlike mass, reminding one of dry crushed clay, most of the particles of which were 40-100 mkm in size.

Organic substances finding their way into the river come under two categories --easily decomposed organic matter and petroleum products. To the first belong substances capable of relatively quick biochemical transformations in the conditions of a water course. These are pollutants coming from animal-husbandry farms located close to where the Yauza is crossed by the beltway, fecal contaminants from numerous small residential centers and remains of vegetation falling into the lower reaches principally in the form of leafy detritus. The total quantity of readily decomposed organic matter of dry weight of bottom soil amounted to 24-31 percent, and the petroleum products were correspondingly 2-4 percent. The composition of the petroleum products

was found to include hydrocarbons of the paraffin series and aromatic hydrocarbons. The main ways of ingress of petroleum products were by way of effluents from enterprises, leakages from the premises of numerous motor transport establishments and petroleum storage tanks, as well as wash-offs from streets, embankments and other asphalted areas. A part of the petroleum products gets into the river as sorptions of solid particles (dust, dirt, and the like) and then settles on the bottom; another part gets into the river in liquid form; at the same time the light fractions are quickly sublimated, while the heavy ones are sorbed by particles of suspended matter and settle on the bottom. Mechanical suspensions, being one of the components of pollution, serve also as an important factor in the self-purification of the water. This is attested by the following fact: while the content of paraffins in filtered Yauza water amounts to decimal fractions of one percent or less, their content in suspensions remaining on the filter amounts to several tenths of one percent. The total nutrient content is 2.7-3.1 percent in mineral phosphorus--0.3-0.6 percent of the dry weight of the bottom soil. These figures correspond to a level characteristic of overgrown lakes. Sulfur compounds consist mainly of sulfides, metals--as compounds of iron (0.3-0.5 percent), aluminum (0.1-0.4 percent), calcium (2.3 percent), and a number of others. The presence of mercury, chromium and manganese has not been established.

Water vegetation, which plays a significant role in processes of self-purification, is strongly suppressed in rivers of this type or is completely absent. Let us recall how the Yauza looks in its upper reaches. The Mytishchi marshes, where it gets its start, have copious growths of reeds, cattails and sedge. Flowing from the marshes, the waters of the river slowly seep, throw growths of marsh horsetails, rushes, bur reeds, freeing themselves of suspend matter and becoming enriched with oxygen.

There is practically no fish in the Yauza and small rivers like it. Bottom macroinvertebrates are represented by the oligochaeta worms of the family of turbificides (pipemakers). About $8.8 \cdot 10^3$ specimens of these worms (or $4.6 \cdot 10^3$ g of biomass) are found per square meter of the bottom surface in the dirt.

Of the 445 km^2 of area of the water drainage system, more than half is on territory lying within the limits of the Moscow auto beltway. The river flows through the territories of Babushkinskiy, Dzerzhinskiy, Sokol'nicheskiy, Kuybyshevskiy, Baumanskiy, Kalininskiy, Zhdanovskiy and Proletarskiy rayons, which are characterized by dense construction, large asphalted areas, existence of rain sewers and operation of numerous enterprises of various industries, which naturally effects the condition of the river.

Pollution has by no means been a problem of solely the present day. Artisans settled at its lower reaches back in the 15th century. By the 17th century, several large villages of artisans had been established on the left bank: Goncharnaya, Kotel'nich'ya, Tagannaya, Staraya Kuznetskaya. Water, sand and clay were taken from the river, while sewage and waste products from the shops were dumped into it. The flourishing of handicrafts on the Yauza can still

be recalled from the names of some of the streets, embankments and squares. In the 19th century, with the growth of industry, the condition of the river deteriorated sharply.

In the thirties of the 20th century, implementation of a broad program was started of restoring the river and improving its banks. The Volga water flowing to Moscow replenished the Yauza: Golovinskiy Canal connected the Likhoborka River with the Khimki Reservoir. The once rubbish cluttered banks were dressed with the concrete of the embankments protecting the city from flooding and were connected by bridges in many places. A water regulating hydroengineering complex was built not far from the mouth.

The conducted studies served as the basis for the "Planned Tasks for Designing the Regulating and Bank Reinforcement of the Bed of the Yauza River from the Exhibition of National Economic Achievements to its Sources," developed by the specialists of the No 7 workshop of the Mosinzhproyekt Institute and the Gorgidromost Trust. This work sets forth a whole series of measures, the realization of which would result in a basic solution of all the problems. The central idea of the plan is the separation of heavy-rain runoffs and industrial discharges from the river beds. To achieve this, bypass collectors are planned are planned to be laid along the banks of the Yauza and its tributaries by means of which the runoffs will go to a canal leading to centralized purification installations in the region of the Kur'yanovskaya aeration station. The water shortage arising from the construction of the bypass collectors will be more than made up by supplied water. Planned water bodies in the segment from the Exhibition of National Economic Achievements to the Moscow auto beltway will be supplied from the reserves at Khimki water reservoir via the Golovinskiy Canal, while the water bodies of the upper Yauza--with reserves from Klyaz'minskiy water reservoir by way of the water conduit leading to the TeTs-23.

The actual flooded river bed will be a concrete lined canal with berms, the precipitation from which in the midsummer period will be washed off into the basic bed of the river. On this canal it is planned to create a cascade of water bodies for regulatory, decorative and water-sports purposes: from the bridge at the Yaroslavl' Highway to its intersection with the line under construction of the Kaluga-Riga radius of the Metro, the river will be broken down into 9 sections. The largest of those being created will be the Mytishchi and Yauza-Likhborka (not far from the Main Botanic Gardens) water reservoir. As a result of the almost total removal of runoffs, the entire cascade will be filled with clean water.

The realization of the complex of outlined measures is calculated for more than one five-year plan. This is understandable--the work will be tremendous. But scientists and specialists are already thinking of making the water cleaner. In 1974, on the initiative of the Institute of Water Problems of the USSR Academy of Sciences, work was undertaken jointly with the Administration of Road Services and Improvements of Mosgorispolkom on finding possibilities for intensification of the processes of the river's self purification.

The main hindrance to active self-purification of the river from pollution comes from toxicants--heavy metals, petroleum products; reduction of their content will help increase the self-purification capabilities of the river. This aim likewise will be served by the work of cleaning of the river bed. In this connection, it will be necessary to conduct a detailed inventory of all runoffs with a most detailed recording of their volumes, chemical compositions and toxic properties.

All valuable initiatives in this area deserve attention.

A sign of the Yauza's "recovery" (that is, weakening of the influence of toxic runoffs) will be, paradoxical as it may seem, a deterioration of its oxygen regime: the elimination of toxic oppression will result in intensification of the processes of biochemical oxidation of pollutants and corresponding growth of oxygen consumption. Under these conditions, the river will be aided significantly by artificial aeration--saturation of the water with oxygen with the help of special devices, which are already been widely used in fishery management.

Thus the program of the most immediate measures aimed at bringing the Yauza back to health must provide: continuation of the work of cleaning the bottom; execution of a complete inventory of discharges of industrial and municipal enterprises of the basin; determination of toxic discharges and their immediate termination; operation of artificial aeration at places with the most sharply marked oxygen deficit.

As for the upper reaches of the Yauza and of those of its tributaries, which are weakly polluted (Serebryanka, Ichka), saving them will be assisted by careful protection of the forest stands through which they flow. These tasks are in the range of view of the administration of the Izmaylovo Forest Park and the creation of a natural park in the Losino-Ostrovo forest tract, which will become a reliable protection for the entire Verkhne-Yauza complex and the upper reaches of the Ichka.

Making the Yauza cleaner means not only helping it but Moscow River as well, which in the final analysis will bring about an improvement in the condition of the capital's whole water basin.

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WATER SUPPLY PROBLEM OF INDUSTRY IN MOSCOW

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Moscow GORODSKOYE KHOZYAYSTVO MOSKVY in Russian No 6, Jun 77 pp 30-31

[Article by Z. Romanova, legal expert: "Land Is Wealth, Water--Treasure; For Purposes of Discussion"]

[Text] The tumultuous growth of industry is having undesirable consequences for us. For example, the volume of substances polluting the air ejected solely by transport and power installations has doubled in the last 10 years. Calculations made by the Soviet scientist M. L'vovich indicate that due to the large increase in the volume of sewage, even with a fivefold upgrading of the quality of purification, the pollution of water resources may increase threefold if more effective measures are not taken. The hydrologic regime of water objects affects significantly the condition of the entire environment as a whole. Here are facts: the urban population of our country in 1968 used 25 times more water than in 1928. The average daily supply of water from the Moscow aqueduct in 1976 amounted to 4,736,000 m³, with the needs of industry requiring almost 30 percent of the indicated volume.

During the present five-year plan, industrial production is to increase 35-39 percent. Consequently industry's water requirements will continue to grow. The question arises: how can they be supplied in the future if water reserves are limited? One solution lies in the strict adherence to established rules and technological norms of water use.

Important control functions relative to the observance of these rules are being performed by the Mosvodoprovod Trust of the Administration of the Water Supply and Sewerage Management of Mosgorispolkom. It has the right to limit the release of water to industrial enterprises, provides them with recommendations on reducing its expenditure, keeps track of the creation of recycled water supply systems. Such systems are now being built by about 200 of the capital's enterprises.

The realization of such measures undoubtedly produces positive results. But the protection of nature is a complex task, requiring the joint efforts of many organizations and state organs. An important role belongs here to legislation. Reference is made not only to the adoption of new acts but also to the introduction of additions and changes to already existing ones.

The principle of rational use of water resources is secured in the Fundamentals of Water Legislation of the USSR and Union Republics, in water codes, decrees of the USSR Council of Ministers. The norms of these acts serve as points of departure in the matter of improving water use. But in order to have it deeply fixed, as the lawyers say, in the consciousness of subjects of the law, we think that much still needs to be done.

Let us take, for example, legislative norms regulating the activity of industrial enterprises—one of the biggest consumers of water. The operation of norms of water legislation is aimed at the direct regulation of relations arising in relation to the use of water objects (rivers, lakes, seas) where one of the parties is an enterprise or institution with its own water intake. At the present time there are about twenty such enterprises in Moscow. The greater part of them enjoy the services of the Moscow water supply. The relations established between the industrial enterprises and the Mosvodoprovod Trust are civil-legal and belong to the category of these which come about from provision of material-technical services. Water, as the object of these relations, possesses all the properties of a commodity since definite labor is expended on its acquisition and purification. These commodity-monetary relations are regulated by civil legislation. It is regulated in much greater detail by the Rules for Use of the Municipal Water Supply and Sewer System established by an Order of the RSFSR Ministry of Housing and Municipal Services. This normative act, regulating relations on the use of water by industrial enterprises is first of all of an intradepartmental character. On its basis, a decision by the ispolkom of the Moscow City Soviet of 15 October 1974 promulgated the Rules for Use of the Moscow City Water Supply, paragraph 25 of which enumerates the duties of subscribing clients. They all boil down to the proper, safe operation of water supply lines and installations. But they do not contain instructions on the important duty of all responsibilities and organizations—to use water rationally, economically, without expending it there where a minimal quantity would do. Should not every consumer be concerned with reducing the expenditure of water? Even today this is a foremost task and will be even more so in the future. Securing of the Rules on this duty would be greatly helped by the establishment of measures of incentives for organizations that reduce expenditure of water.

Taking into consideration the importance of problems arising in the use of water resources, their universal character, we should dwell particularly on what an important place among other measures is occupied by the use of industrial water supply systems. More and more of them have been appearing in recent years. For the purpose of regulating their relations with subscribing clients, it is now time to work out an extradepartmental normative act in the form of a statute on the manner of use of an industrial water supply system enacted, let us say, by the republic's Council of Ministers in agreement with the Ministry of Housing and Municipal Services and organs regulating the use and protection of water.

This act must include not only norms pertaining to the technically proper connecting of enterprises to industrial water supply systems and operation of water supply lines and installations but should also be aimed at the regulation of the rational use and protection of water resources.

Another variant is possible. In 1965 the Statute on the Socialist State Production Enterprise was enacted. Here there were grouped standards relating to production, financial, cultural-everyday activity. This basic act regulates the most diverse questions of life at enterprises. It is possible to find in the Statute standards of labor, administrative, financial and civil legislation. They contain many rules and responsibilities of enterprises. But it does not state the duties of a thrifty attitude to the natural environment, rational use of the natural resources of our country. For this reason the existing Statute should be supplemented with norms that take into consideration those responsibilities which enterprises have in the protection of nature, including water supply.

Here is an example: paragraph 57 of the Statute points out the right of an enterprise where necessary to change the technology of production processes and enumerates the following instances: if these changes improve production quality, lower production cost or produce some other positive gain. Why should there not be indicated here such as reduction of water consumption, decreasing the pollution of sewage, use of recycled water supply systems and others aimed at protection of the environment?

The actual Statute would benefit considerably (and so would nature) if it contained an independent section called, let us say, "Responsibilities in the Field of Rational Use and Protection of Natural Resources."

The implementation of these legislative measures would result in a significant acceleration of adoption of industrial water supply systems and the utilization of other measures at the conservation of one of our true treasures--water. Not without reason does folk wisdom say: "Land is wealth, water--treasure!"

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WATER CONSERVATION, TREATMENT IN SEVERODONETSK

Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 77 p 13

Article by S. Ivanenko, the newspaper's correspondent, Severodonetsk, in the section: "Environmental Protection": "So That the River Will Be Clean"

Text The Severodonetskoye Industrial Association, "Azot," takes in almost 90,000 cubic meters of water per day for settling and biological treatment. Four fifths of the water discharged after treatment is recycled. Before long, the treatment plant's capacity will grow to 113,500 cubic meters per day.

A. Karmazina, treatment section technical director, says that the formerly "dead," if it can be expressed that way, water in the settling ponds will again become suitable for life. In these ponds, young fish grow into carp, tolstolobik and white amur. Sterlet were put in here as an experiment and they became acclimated. Inhabiting the area next to the reservoirs-settling basins are silver and red fox, mink, antelope and a variety of birds, including waterfowl. They all live on the forage which grows next to the settling basins, in the sections watered by the treated water.

The "Azot" treatment plant is a huge facility taking up 75 hectares of land. About a third of the water used in the firm for industrial purposes comes from the treatment plant.

A section for the protection of nature has been set up in the industrial department which not only coordinates water and gas treatment, but also develops measures for the future. Construction of a cleaning station for washing rail cars will be completed this year. It will use up to 2,600 cubic meters of water per day. After settling, it will all be recycled.

Water consumption for industrial purposes is constantly being reduced at the firm. Consumption was reduced by 8 million cubic meters per year just from the installation of air conditioners in the oxidation shop.

On the whole throughout the enterprise, the installation of air conditioning reduced the annual consumption of water by 540 million cubic meters, including the daily consumption of river water by 120,000 cubic meters.

The sewage treatment shop collective is a permanent participant in the VDNKh Exhibition of the Achievements of the National Economy of the USSR. This is one more corroboration of the collective's services in protecting the environment.

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CONSERVATION OF SOVIET FORESTS

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 77 pp 44-46

Article by N. N. Khramtsov, chief of the administration of forest conservation and protection of the State Committee for Forestry of the USSR Council of Ministers: "Protect and Increase Forest Resources"; for a similar article, originally published in EKONOMIKA SOVETSKOY UKRAINY No 6, Jun 77, see the article entitled "Environmental Protection, Forestry" in JPRS 69772 (TEQ 146), 12 Sep 77 p 31]

Text The concern of the party and government about protecting and increasing forest resources is reflected in legislative acts of the Soviet State. And in connection with this in our country much attention is being devoted to protecting forest stands from harmful organisms. And this is quite justified: for if the necessary measures are not taken, pests and diseases can cause no less harm than forest fires. This, incidentally, has happened more than once in the past. The nun moth, for example, in the middle of the last century repeatedly damaged the spruce forests of the western and northwestern regions of Russia so badly that they died in many areas. In the fir groves of the Moscow, Smolenskaya and some other central Russian gubernias a mass reproduction of bark beetles occurred, which was caused by littering and disturbance of forests by haphazard felling on mining principle. The Siberian silkworm moth periodically did great damage to the conifer forests of Siberia, which caused considerable economic harm in some regions. At the end of the 1870's the dessication of forest stands due to damage by cockchafer larvae was noted on large tracts in the steppes. On a large territory the stands were killed by needle-mining insects.

All this dictated the need for at least some organization of forest protection and commenced the research on forest entomology and phytopathology in Russia. In 1910 there was published an entomology course, which was prepared by the well-known entomologist N. A. Kholodkovskiy, who summarized the accumulated factual material. This book subsequently became a reference book for several generations of specialists. Scientific research work on the study and elaboration of measures to control cockchafers, bark borers, various pests of artificially created stands and so on was expanded at experimental forests. There took part in this work such prominent specialists as I. Ya. Shevrev, I. K. Tarnani, Z. A. Pshemetskiy, A. A. Yachevskiy and Z. S. Golovyaniko. The works published by them played an important role

in the development of domestic forest protection. However, during the pre-revolutionary period the practical and scientific work in this area was not properly developed.

Planned measures on the protection of forests, which are carried out on a large scale, and scientific research were developed only after the Great October Socialist Revolution.

The elimination of the litter of forests and the disposal of the consequences of forest fires following the 1921 drought began with the first years of Soviet power. In 1926 the airborne chemical control of the nun moth was carried out for the first time in Gor'kovskaya Oblast. This commenced the successful use of the airborne method when eliminating seats of the most dangerous needle- and leaf-mining pests.

With the formation in 1936 of the Main Administration of Forest Conservation and Afforestation /Glavlesookhrana/ attached to the USSR Council of People's Commissars a special forest protection service was created.

In the forests under the management of Glavlesookhrana sanitation measures and control of the most dangerous pests and diseases were organized, which made it possible to considerably reduce the damage. In 1938 the Statute on the Protection of Forests of the Water Conservation Zone was approved, and then under the direction of C. K. Flerov instructions, regulations and directions on the organization and technology of forest protection operations were elaborated and issued.

World War II interrupted many operations in timber management, but during these difficult times for our country everything possible was done to conserve the forests and the necessary measures were taken to reduce the damage from pests and diseases.

Since the formation in April 1947 of the USSR Ministry of Forestry forest protection measures were implemented according to a unified plan for the entire country. The increase of the amount of sanitation and other protective measures was accompanied by an increase of their effectiveness and, in particular, of the chemical method of control, which has been improved from year to year. The extensive use of aircraft made it possible to eliminate the seats of needle- and leaf-mining insects which earlier, during years of massive reproduction, frequently caused considerable harm.

Today the protection of forests from pests and diseases is one of the most important components of the extensive program of measures being implemented in our country on the intensification of nature conservation and the efficient use of natural resources. Considerable assets are allocated annually for forest protection work. Forest scientific research institutions and institutions of the USSR Academy of Sciences and other departments are conducting comprehensive research for finding the most effective methods and means of control.

Since protective measures are very closely connected with an entire complex of timber management and timber cultivation operations, their fulfillment is obligatory for the organizations and enterprises which bear the responsibility for the state of forests. This is looked after by a specialized service, to which belong interrayon engineer-forest pathologists, stations for the control of pests and diseases of the forest and specialized forest pathology expeditions.

The timber management organs and the forest protection service have been entrusted with the forest pathological inspection and surveys, the adherence to sanitation regulations during the management of forestry and forest exploitation, the performance of sanitation and other preventive measures for the purposes of preventing the mass occurrence and spread of harmful insects and diseases, as well as the timely elimination or localization of emerging seats.

Until recently the chemical method was the leading method in forest protection, especially in the control of needle- and leaf-mining insects. It will also remain the predominant method in the immediate years to come, especially in the control of such dangerous pests as the Siberian silkworm moth and the pine moth, the pine noctuid and pine looper, pine sawflies and other needle-mining insects. Chemical agents are also no less important in the protection of oak and other valuable deciduous stands and in the control of cockchafers, the pine bark beetle, pine-shoot tortrix moths and several other harmful species.

When cultivating forests special attention is devoted to strict regulation of the application of compounds for the purposes of preventing their harmful influence on the environment. The radical changes in the variety of chemical agents, which have occurred in recent years, are of great importance here. The task of replacing stable cumulative chlororganic pesticides with ones which are less toxic and are quite rapidly decomposable in the environment already has practically been solved. New compounds of selective action are being created, which are harmless to man and useful fauna.

Included in the store of modern chemical agents, which are allowed to be used in forestry, are organic compounds of phosphorous (phosphamide, chlorofos, metathion, benzophosphate and others), haloorganic compounds (gamma-isomer of hexachlorocyclohexane) and others. The further improvement of the chemical method is taking the path of the further expansion of the variety and spheres of application of pesticides, their more efficient use and the establishment of substantiated sanitary norms.

For these purposes promising chemical agents are being studied, selected and tested under production conditions. Improved forms of treatment, in particular, the ultra-small-capacity spraying with concentrated solutions of insecticides, are being introduced into production. For example, carbofos and ritsifon have been tested by the method of ultra-small-capacity spraying in the control of the pine noctuid and fox-colored sawfly.

Granulated compounds are promising for the practice of forest protection. The tests made in 1975 for 10-percent granulated bazudin against the larvae of the eastern May beetle made it possible to recommend this compound for practical use.

The extensive scale of chemical treatments dictates the need for the strict adherence to the procedure established by the USSR Ministry of Forestry, under which the control of pests should be carried out only under the direction of specialists having the proper training, while the sizes of the tracts being treated with chemicals in each specific case should be established only on the basis of the data of forest pathological surveys.

In recent years the biological, and especially the microbiological, method has assumed more and more importance. A number of bacterial compounds are already being used on a production scale.

Dendrobatsillin (developed at the Irkutsk University under the direction of Professor Ye. V. Talalayev) and insektin (at the Institute of the Forest and Wood of the Siberian Branch of the USSR Academy of Sciences under the direction of Professor A. B. Gukasyan) are intended above all for the control of the Siberian silkworm moth; gomelin (at the Belorussian Scientific Research Institute of Forestry under the direction of Candidate of Biological Sciences L. T. Krushev)--the control of the pine moth; entobakterin is recommended against pests of wind forest belts.

The virus compound virin-ENS_h (developed at the All-Union Scientific Research Institute of Microbiological Plant Protection and Bacterial Preparations under the direction of Candidate of Biological Sciences Ye. V. Orlovskaia) is undergoing extensive production tests against the gypsy moth. The results of the tests in a number of cases were favorable, but the work should be continued for the purposes of a more detailed study of the mechanism of the effect of the compound and the preparation of scientifically substantiated methods and means of treating seats in forests.

The virus compound diprion-virulin (developed at the Biological Institute of the Siberian Branch of the USSR Academy of Sciences by candidates of biological sciences G. V. Larionov and V. N. Zhimerikin) is also being successfully tested under production conditions against the fox-colored sawfly.

Scientific research is being conducted on the use of microbiological agents also against the causal organisms of diseases of tree and brush strains, norms of consumption, the technology of the use, the mechanism of the effect and other questions connected with the increase of the effectiveness of their use are being elaborated.

New forms of bacterial compounds are also being tested, the possibility of expanding the spectrum of their effect is being examined.

A check showed, for example, the great effectiveness of dendrobatsillin and gomelin in controlling a number of needle- and leaf-mining pests, in particular, leaf roller moths and inch worms. For the purposes of increasing the toxicity for insects, bacterial compounds were tested in a mixture with sublethal doses of insecticides.

Today promising biological agents are being extensively introduced in the practice of controlling pests and at the same time scientific research is being continued. It remains to ensure the interchangeability of some compounds and the retention of their activity.

Special attention should be devoted to the use of entomophags.

Current practice is based on the fulfillment of systems of measures, to which belong measures not only on the destruction of the seats of harmful species, but also on the creation of unfavorable conditions for their development, the protection of useful fauna, as well as on increasing the resistance of stands. An example of such successful integration in the practice of forest protection is the control of leaf roller moths according to the program developed at the All-Union Scientific Research Institute of Forestry and Mechanization under the direction of V. S. Znamenskiy. These recommendations proved themselves completely in protecting oak stands from leaf-mining insects.

A comprehensive method with allowance made for the phenological forms of oak (developed at the Ukrainian Scientific Research Institute of Forestry and Agromelioration under the direction of I. D. Avramenko) is also recommended for extensive use in oak groves against leaf-mining pests. The use of insectivorous birds and other natural factors, bacterial compounds and insecticides, as well as the formation of stands which are little suited for the development of leaf-mining pests are also planned. In this case it is necessary to take into account the structure of oak groves and to approach differentially preventive and extermination measures of control, distinguishing the sites with early and late opening forms of oak.

Also of interest is the experience of the biological control of pistachio and walnut moths in Tadzhikistan (developed at the Tadzhik Forest Experimental Station by Candidate of Biological Sciences B. M. Peregonchenko), against which until now there were no radical measures of protection. Now trichogramma and gabrobracon (bred in the production biolaboratory set up by the republic State Committee for Forestry and the Central Asian Scientific Research Institute of Forestry) are being used against these pests, which is making it possible to reduce the damage to walnuts by more than 70 percent.

Studies of the species composition and the correlations of harmful and useful species of forest insects, of their biological and ecological peculiarities are at the basis of a set of measures for the control of pests of young spruce trees (developed at the Lithuanian Scientific Research Institute of Forestry under the direction of V. T. Valenta).

Zonal systems of protective measures are being successfully used in forest nurseries (developed at the Tatar and Bashkir forest experimental stations of the All-Union Scientific Research Institute of Forestry and Mechanization under the direction of candidates of biological sciences N. M. Vedenikov and I. A. Ibragimov). They make it possible to reliably eliminate such widespread diseases as the lodging of conifer seedlings, the ordinary and snow needle-shedding disease of the pine, cytosporosis and rust of the leaves of poplars.

The decree, "On Measures on the Further Improvement of the Conservation of Forests and the Efficient Use of Timber Resources," which was adopted in June 1977 by the USSR Supreme Soviet, and the approved Fundamentals of Forest Legislation of the USSR and the Union Republics are a display of the particular concern of our party and government about forests.

In these legislative acts an prominent position is occupied by questions of the conservation and protection of forests, which are recognized as one of the most important state tasks. In the Fundamentals of Forest Legislation it is indicated that all forests are subject to protection from fires, illegal felling, the violation of the established procedure of forest use and other actions causing harm to the forest, as well as to protection against pests and diseases.

The state forestry organs have been entrusted with supervision of the state of affairs of the conservation and protection of all USSR forests.

In conformity with article 11 of the Fundamentals of Forest Legislation, the care of the forest and its protection against pests and diseases should be carried out by means and methods which do not do harm to man and the environment. This requirement obliges forestry workers, and above all the specialists of the forest protection service, to ensure the more extensive use of integrated methods of controlling pests and diseases, which are based on the efficient use of natural factors that check the spread of harmful objects and increase the hardiness of stands, combining this work with the use of effective biological agents and chemical compounds which do not represent a danger to the environment.

The further development and increase of the efficiency of forest protection are a considerable contribution to the solution of the important state-wide task on the conservation and multiplication of timber resources, which stems from the Basic Law of our life--the USSR Constitution, which among the most important duties of citizens contains the requirement to protect nature and conserve its resources.

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ENVIRONMENTAL PROTECTION IN THE COAL INDUSTRY

Moscow UGOL' in Russian No 9, Sep 77 pp 56-59

[Article by G. G. Voznyuk, USSR Minugleprom (Ministry of the Coal Industry)]

[Text] The functioning of coal industry enterprises has a certain negative effect on the environment. Every year, simultaneously with mining the coal and shale from the mines and open cuts, about 2 billion m³ of underground waters are pumped out most of which are contaminated in the process of production. Drying up mine and pit waters leads to the depletion of underground water reserves. Several thousands hectares of land are destroyed in underground coal mining or in strip mining. Millions of cubic meters of rocks are piled in dumps annually. Mining and reprocessing coal result in the formation of harmful solid and gaseous substances which are discharged into the air.

Without proper measures, all of this will lead to the contamination of bodies of water, soil and air, and the destruction of natural landscapes.

In this connection, the following basic problems of environmental protection arise: eliminating or reducing the extent of their harm. This problem is solved most efficiently by changing traditional technological processes.

Another important problem of environmental protection is the elimination of consequences of the negative effects of mining on nature.

This involves the creation of efficient and economic methods and facilities for cleaning waste water, trapping solid and gaseous harmful substances contained in various discharges; extinguishing burning dumps and reclaiming stripped land.

The danger to the environment increases with the growth in the volume of mining. The people must take steps not to permit the arrival of the moment when the pressure on the environment is greater than the ability of nature to restore itself biologically.

The party and the Soviet government have always given great attention to this important public-social question. At present, the solution of the problem of environmental protection has become of special importance.

"Develop and realize measures on environmental protection, efficient utilization and restoration of natural resources" -- this is written in the "Basic directions for developing the national economy of the USSR in 1976-1980."

In accordance with party directives, all ministries and departments are developing plans for environmental protection and efficient utilization of natural resources, and these plans are integral parts of annual and future national economic plans.

Following the directives, the coal industry implemented a set of measures for strengthening environmental protection.

At present, practically all associations in the industry have environmental protection services. Most of the associations have specialized subdivisions (administrations, sections, laboratories) for doing work associated with the protection of the environment. They operate water-cleaning installations, reclaim stripped land, regulate purification installations and dust and gas trapping apparatus, as well as monitor the quality of waste waters.

In recent years, the volume of capital construction of environmental protection facilities increased systematically. In 1976, 26 percent more money was spent for these purposes than in 1975.

During this period, dozens of installations were put in operation for cleaning waste waters and discharges from harmful substances, as well as systems for circulating the water supply.

In 1975, the All-Union Scientific Research and Planning-Designing Institute for Environmental Protection in the Coal Industry (NIIOSugol') was organized. So far, this is the only industrial institute that works on the environmental protection problem comprehensively.

An "Environmental protection" section is included without fail in plans for construction, expansion and modernization of industrial enterprises. Norms, instructions and methods were developed and are being introduced.

The steps taken made it possible to systematize and accelerate environmental protection work, strengthen the material equipment and scientific bases and, as a result, reduce the harmful effect of coal mining on the environment.

The situation in the industry may be characterized by the following data:

In 1976, by building new structures and raising the efficiency of existing ones, introducing normalized water consumption and water drainage, increasing repeated utilization of cleaned and uncleaned waste waters, the volume of waste waters exceeding norms for contamination was reduced by 13 percent as compared to 1975.

The best results in this respect were obtained by the "Chelyabinskugol'" and "Novomoskovskugol'" associations, in the Ukrainian SSR Minugleprom, as well as by the "Karagandaugol'" and "Dal'vostugol'" associations where over 85 percent of the waste waters meet approved norms. At present, enterprises of the "Karagandaugol'", "Yuzhkugbassugol'", "Donetskugol'", "Rostovugol'" and other associations have over 20 filtration stations for cleaning waste waters to indicators close to these specified for drinking water. Such water may be used widely for the technical and operational needs of the industry. The costs of its purification is 5 to 9 kopecks per m^3 , while the cost of drinking water is 16 to 24 kopecks per m^3 .

Good purification results are produced by sedimentation and purification pools of large capacities. In this case, operating expenditures are required only for maintaining the structures. Under proper conditions, this is a very inexpensive and efficient version, especially when additional cleaning of waste water is required.

At present, about 900 cleaning installations are in operation at enterprises of the industry, with over 600 of them used for cleaning mine waters. Many structures at mines are horizontal sedimentation pools operating on the principle of sedimentation with using reagents. The efficiency of their operation is 25 to 40 percent. Taking into account the recent increase in requirements, the problem of improving the utilization of existing cleaning structures deserves special attention. The experience of the "Makeyevugol'" and "Voroshilovgradugol'" associations indicates the possibility of raising the efficiency of their operation by two to three times.

Institutes of the industry developed efficient technological arrangements for purifying production waste waters, which are used as a basis for developing project plans for building new structures and modernizing existing ones.

Enriching factories of the industry changed over basically to closed arrangements of water-sludge management, although some of them discharge waste waters periodically. About 230 sludge sedimentation pools and over 300 silt accumulators are operated at factories for trapping sludge and piling silt. Some individual silt accumulators are emptied when filled. An urgent problem of these enterprises is changing over to closed arrangements for water supply, eliminating, as a rule, external structures.

In 1976, over 600 million m³ of fresh water were used for production needs at the industry's enterprises, including about 190 million m³ of drinking water. Even according to reduced figures, drinking water cost the industry about 40 million rubles. At the same time, waste water for enrichment, transport, prevention of silting, dust suppression, cooling and other technical needs is not being used sufficiently so far, especially, at the "Vorkutaugol", "Intaugol", "Novomoskovskugol" and "Tulaugol" associations.

Positive experience in the wide utilization of mine waters was achieved in the "Karagandaugol", "Chelyabinskugol", "Gidrougol" associations. A number of basins successfully use mineralized mine waters for enrichment needs. Many mines in the industry use the "Don" installations which purify mine waters underground for later use in irrigation. At present, about 150 such installations are in operation and they can be manufactured easily by the associations.

The problem of air protection at enterprises of the industry is being solved in two ways.

The first -- reducing sources of air contamination by eliminating small boiler installations, extinguishing rock dumps (terrikons) of mines and enriching factories, and laying mine rocks and enrichment wastes into flat dumps with their simultaneous preventive treatment.

The second -- equipping boilers with dust and gas trapping devices and changing factories over to three-step systems of dust trapping.

The plan for protecting air in 1976 was fulfilled for the industry as a whole. About 40 burning terrikons were extinguished, over 50 small boiler installations were eliminated and about 60 dust-trapping equipments were installed.

The highest indicators of the general efficiency of air protection measures (ratio of trapped harmful substances to those discharged, in percents) were achieved by the following production associations: the "Bashkirugol" (98.3), the "Gidrougol" (72.1), the "Kuzbassugol" (69.9), the "Yuzhkuzbassugol" (69.5), the "Primorskugol" (60.8), the "Vakhrushevugol" (56.6) and the "Karagandugol" (51.8). The experience of the "Primorskugol" Association in manufacturing dust extractors with their own forces merits approval.

Work on stopping operation of conical dumps, their preventive treatment and extinguishing them is done at the majority of the associations. At the start of 1977, 11 associations in the industry have no burning terrikons, while the "Karagandaugol" Association extinguished the last terrikons in 1975 and rocks are laid only in flat dumps here.

The basic sources of air contamination at enterprises of the industry remaining are the municipal and industrial boiler installations and burning rock dumps.

The problem is to make, in the very near future, a list of air contamination sources at all enterprises of the industry and determine the extent of their danger. After that, it is necessary to develop and carry out measures to reduce contamination sources to the limiting allowable concentrations (PDK) in the air and organize systematic monitoring of their observance.

Work related to the reclamation of land developed at a considerable rate in recent years. While in the Ninth Five-Year Plan period, 8700 hectares were reclaimed, of these 2100 hectares were in 1975, in 1976 4200 hectares were reclaimed for an annual plan of 3100 hectares.

In 1976, the reclamation volume was increased as compared to 1975 by the following associations: the "Karagandaugol'" (1063 hectares), the "Estoslanets" (volume of work increased by 73 percent, 404 hectares released), the Krasnoyarskugol'" (4 times, 240 hectares), the "Chelyabinskugol'" (3 times, 107 hectares), the "Tulaugol'" by 49 percent, 300 hectares) and the "Dal'vostugol'" (by 53 percent, 202 hectares). The greater volume of work was achieved basically by using available reserves. Experience of the best associations indicated that the main factor in accelerating reclamation was good planning, specialization and concentration of work, as well as a positive attitude to this important problem by association managers. In a number of associations (the "Tulaugol'", "Karagandaugol'", "Artemugol'" and "Ukrazapadugol'") specialized administrations are doing reclamation work in the amount of over a million rubles per year.

With the rise in the volume of land reclamation work, the reduction in the cost of such work becomes very important.

The cost of such work varies for individual associations between 500 to 10,000 rubles per hectare. For all other conditions being equal, the cost is lower where reclamation is "written in" in the technology of mining and dump formation (the "Estoslanets," "Dal'vostokugol'" and the "Aleksandriyaugol'" production associations).

Especially important in the problem of environmental protection is the efficient utilization of mineral raw materials byproducts and production wastes.

Various minerals are extracted along with coal in mining and they can be utilized in the national economy. They are also contained in enrichment tailings. Burned-out terrikon rocks, limestone, sand, sandstone, carbonaceous clays, argillites and aleurolites are also useful raw materials.

In 1976, the industry utilized almost 500 million m³ of overburden rocks from strip mining, enrichment tailings and burned-out rocks of terrikons. This raw material was used for fills in worked-out spaces in mines, for various construction purposes, and for filling worked-out spaces of open cuts and mine cave-ins.

Byproduct raw materials are used in the majority of associations, but their cost is not always determined.

In using byproduct raw material, especially for construction purposes, it should be considered as a commercial product that has a certain price. The income from its utilization should, to a certain extent, cover costs of environmental protection.

Of great importance is the utilization of raw material by extracting various valuable components from it.

A number of studies proved the expediency of utilizing byproduct raw materials and enrichment tailings in a number of associations (the "Yuzhkuzbassugol", "Karagandaugol", "Vorkutaugol", "Ekibastuzugol", "Sredazugol" and a number of associations of the Ukrainian SSR Minugleprom). Plans were developed for building production facilities for making bricks and light fillers from tailings at the "Abashevskaya" OF [Enriching Factory] (The "Yuzhkuzbassugol" Association), the "Saburkhanskaya" OF (the "Karagandaugol" Association) and the "Severnaya" mine OF (The "Vorkutaugol" Association). A technical-economic substantiation was prepared for building a shop at the OF of the "Dolzhanskaya-Capital'naya" mine of the "Sverdlovantratsit" Production Association). A temporary installation was built for reprocessing overburden rocks from the "Bogatyr" strip mine of the "Ekibastuzugol" Production Association to make thinners.

To reduce the harmful effects of mining on the environment one problem facing the industry is of creating technologies without wastes or with very little wastes. An example of this is the OF of the "Kimovskiy" strip mine of the "Tyulaugol" Production Association. In the process of enriching run-of-the-mine coal, it obtains commercial coal, clay (used for making bricks) and iron pyrites (used for making sulfuric acid), i.e., three commercial products. The water supply to the factory is in the closed circulating arrangement. The factory has no production wastes.

Mining of coal and shale, as well as their enrichment, will increase considerably by the end of the Tenth Five-Year Plan period. However, volumes of water consumption and water drainage will change very little. The volume of water cleaned to the norms will increase by more than 400 million m³. This will be done by building new water treatment installations and modernizing existing ones. By improving water circulation systems and increasing the utilization of mine waters for technological needs, the volume of circulating water and of water used repeatedly will increase by more than 1.3 times.

Measures for reducing dust formation and further equipment of boiler and drying installations with dust and gas trapping equipment will make it possible to increase the trapping of harmful substances discharged into the air by almost 1.3 times.

The areas of reclaimed land with further concentration and specialization of reclamation will more than double, which will make it possible to reduce sharply the gap between stripped and reclaimed areas of land.

The realization of measures planned in the coal industry will make it possible by 1980 to reduce sharply the harmful effects of the industry on the environment.

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2291
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PROBLEMS OF NONCENTRALIZED HEAT SUPPLY DISCUSSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 77 p 13

Article by M. Styrikovich, academician, and I. Livchak, professor and doctor of engineering science, in the section: "Environmental Protection": "What a Boiler Room 'Puffs and Blows'..."]

Text Due to the comparatively cold climate in the greater part of the territory of our country, an enormous amount of fuel is required to supply heat to buildings.

The majority of industrial, as well as a substantial share of the urban dwellings and public buildings (in major cities this is the greater share) are centrally supplied with heat. We have made great progress in this. Further all possible development of a centralized heat supply is the general trend inasmuch as up to 20 to 25% is saved on generating the heat regardless of the type of fuel used, incineration and ash removal are mechanized and labor outlays are reduced several times.

Also of no little importance is the fact that scrubbing of smoke gases is feasible at both centralized heating boiler plants and thermal power stations. A reduction in pollution of the air basin of cities is also facilitated by placing thermal stations and centralized heating boiler plants outside the cities and discharging the smoke gases at a high altitude.

However, a large share of dwellings and public buildings (in the cities of the country as a whole, and almost all buildings in rural areas) are not centrally supplied with heat; the heat is supplied by local (especially home) boilers and furnaces.

According to data from the Academy of Communal Services imeni K. D. Pamfilov, the amount of heat used by this share of buildings throughout the country as a whole, excluding food preparation which has not been considered here, is (including heat generated by all the cast iron boilers) not less than 70 to 75% of all the heat used by the housing and communal services and the population. In 1976, about 180 million tons of conventional fuel were used for these purposes--a little less than for power generation in all the power stations in the country.

Only 15 to 20% of the fuel used was gas, the burning of which, as is known, pollutes the air less and is easily automated. The remainder was coal, firewood and other (primarily solid, often ungraded and low-grade) types of fuel. Their use entailed large outlays of hard, unskilled labor. According to rough estimates, the number of workers maintaining boilers (primarily seasonally) exceeds 600,000, and the labor expended to maintain furnaces in cities and workers' settlements is more than 100, while in rural areas--on the order of 300, million man-days.

A second shortcoming in noncentralized burning of various kinds of solid fuel is the low efficiency of the heat generators; a third is the pollution of the air basin of the cities: with noncentralized burning, it is practically impossible to efficiently scrub the escaping gases.

The simplest and most efficient way out is to use natural gas and connect consumers to a centralized heating supply. However, this is not possible in a number of cases: many populated areas, especially rural, have no gas network and besides the gas is also needed for other needs.

The connection of small consumers to a centralized heating supply in a low density of building is not economically expedient. Therefore, along with the development of a centralized heating supply and gas supply, noncentralized generation of heat using solid fuel must be improved.

To solve this important national economic and social problem, the quality of the fuel used must be sharply improved. It has to be supplied to consumers mainly in the form of graded coal in 13 to 15 and 25 to 50 millimeter sizes with an ash content of not more than 18%, a moisture content of up to 7%, with a low volatile matter content and, as far as possible, with a low sulphur content or high quality coal and peat briquets. A supply of solid fuel in packaged form is very desirable.

To reduce air pollution by products of combustion in noncentralized facilities, it is advisable to use artificial low-smoke (cleaned coal) fuel like carbolux, distirex and others.

The advisability of using high-grade and improved fuels in a noncentralized heating supply is determined not only by ecological, but also by economical considerations. Use of these fuels will permit raising efficiency by 12 to 18%. There are grounds to suggest that directing investment to industry to enrich solid fuel, just due to the reduction in fuel consumption in the noncentralized heating supply, may turn out to be more efficient than the use of the same investment which now goes into development of industry to extract the solid fuel and transport it.

However, the main advantage in using high-grade and improved fuels lies in the opportunity for mechanization and automation of the burning process by using stokers, gravitational furnaces (with bunkers) and other similar devices in small heat generators. Instead of stove heating, apartment heating, in which one boiler supplies heat for heating not only the entire

apartment, but also for its hot water supply, can be used in low, and in particular rural, buildings. This will substantially free time, especially for rural inhabitants, for socially useful productive labor and relaxation, and moreover, it will bring the organization of public services and amenities of rural buildings closer to the urban.

According to calculations by the Academy of Communal Services imeni K. D. Panfilov, general use of high-grade and improved fuel in noncentralized generators of heat designed for this fuel would permit freeing about 300,000 stokers working in small heating boiler plants and the 300 million man-days which the population expends on firing furnaces.

Working out the concrete measures, the implementation of which would supply the generators of heat in the noncentralized heating supply with high-grade and improved fuel, should be entrusted, in our opinion, to the All-Union Scientific Research Institute of Composite Fuel and Energy Problems of Gosplan of the USSR with the participation of the coal, fuel and oil industry, as well as the Academy of Communal Services imeni K. D. Panfilov as the organization which determines consumer interests.

To successfully solve this problem, it appears that the fuel-concentrating industry, as well as the system of distribution and delivery, in particular, of concentrated fuel to consumers, must be substantially developed and perfected.

Until the problem of supplying local boiler rooms with high-grade solid fuel is solved, the basic types of fuel on which they are actually operating must be determined. For each of the boiler designs being produced, the characteristics of its operation on these types of fuel must be determined: rated heat output, efficiency with various boosters, data on composition of escaping gases (to determine air pollution), etc.

It is to be regretted that up to now tests of boilers in series production have been limited to analysis of their operation on one to two types of mainly high-grade graded fuel.

In planning the fuel supply for economic regions, it makes sense to separately earmark the consumers of a noncentralized heat supply. Meriting special attention are the system of fuel depots, reduction of existing losses of fuel at them and during transport, as well as the possibility of using common fuel depots (with appropriate pre-equipping of them) for sorting high-grade fuel intended for the noncentralized heat supply, that is, using depots of fuel-classification yards.

Fuel supply questions also deserve much attention when working up general plans for development of cities, district lay-outs and technical-economic justification for their development. This is dictated by the fact that the choice of fuel, particularly for noncentralized heating, which to a considerable extent determines the organization of public services and

amenities in the city, cannot be made without considering all local conditions. For example, buildings with local generators of heat capable of polluting the air basin should be placed on the lee side based on the winter wind rose. The siting of fuel depots, especially combined with classification yards, requires resolution of specific transport questions.

Approaching resolution of the questions raised from the positions of programmed-special purpose planning and systems analysis, we hold that the problem of noncentralized heat supply also requires much scientific elaboration.

8545
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RESEARCH FOR LESS TOXIC FUEL

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Oct 77 p 3

[Article by D. Melikov, Baku correspondent: "For a Clean Environment"]

[Text] The Institute of Petrochemical Processes im. Yu. Mamedaliyev of the AS Azerbaijan SSR is developing a process for obtaining non-ethylated gasoline of high quality for cars which will permit a decrease in the toxicity of vehicular exhaust gases.

"This is one of the many measures taken by scholars of the republic in conjunction with specialists working in the area of environmental conservation," said Candidate of Technical Sciences B. Adigezalov, President of the State Committee on Environmental Conservation. "The new constitution of the USSR gave constitutional status to the business of environmental conservation. This obliges all ministries and departments, enterprises, and organizations to take appropriate steps to protect the environment from harm."

At many enterprises in Baku, Kirovabad, and Sumgait, services are now being developed for protecting nature, and a republic administration for regulation and conservation of water and the Baku Regional Inspector for monitoring the work of gas scrubbing installations have been created. Deserving of attention is the comprehensive program developed by the Scientific Research Planning Institute "Gipromorneft" for the creation of technology to prevent pollution of the Caspian Sea during exploration, drilling, production, and transport of oil and gas.

The realization of this program will permit complete elimination of pollution of the Caspian during the development and exploitation of oil fields at sea. Graphic evidence of this is the important objects of economic significance which have already been built and put into operation.

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USSR

BRIEFS

GAS-POWERED TRUCKS--Specialists of the Moscow Motor Vehicle Repair Plant No 7 are completing the reequipment of specialized GAZ-53-A motor vehicles. These vehicles will haul containers with foodstuffs and industrial goods. They will run not on gasoline, but on gaseous fuel, which virtually does not pollute the atmosphere of the city. In all more than 200 of these vehicles will be produced. Text Moscow MOSKOVSKAYA PRAVDA in Russian
27 Nov 77 p 37 7807

CATALYTIC CONVERTERS--Tests of prototypes of series-produced motor vehicles of different makes with catalytic exhaust converters have begun on the streets of the city. They check up to 80 percent of the carbon dioxide and other harmful substances contained in exhaust. The converters were developed by specialists of the Central Scientific Research, Design and Technological Laboratory of the USSR Ministry of Tractor and Agricultural Machine Building. By 1980 10,000 motor vehicles will be equipped with these converters. Text Moscow MOSKOVSKAYA PRAVDA in Russian 30 Nov 77 p 37
7807

LASER STUDIES ATMOSPHERE--A thin beam of a laser cut through the sky, and in a few seconds the data on the purity of the air over the city was ready. In order to do this work, fliers would need days, while chemists would need hours to analyze the samples. Nevertheless, the quality of research would be inferior to that of a laser. The set of equipment for laser location of the atmosphere, which was developed by scientists of the Belorussian State University imeni V. I. Lenin, makes it possible to judge with great precision the purity of the air at any altitude. The instruments are also able to identify the nature of pollution. By changing the color of the beam, scientists correctly determine the percentage content of various gasses. Text Riga SOVETSKAYA LATVIYA in Russian 1 Nov 77 p 27 7807

PLANT AIR POLLUTION REDUCTION--Omsk--New equipment being assembled at the synthetic rubber plant will allow operation without discharge of noxious gases into the atmosphere. It will be degasifying latex--the basis of rubber. The amount of noxious discharges has recently been reduced at the enterprise eightfold. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 7 Dec 77 p 17 8545

BLACK SEA POLLUTION CONTROL--Tbilisi, 17 Nov 77 (G. Lebanidze, PRAVDA correspondent)--The Batumi party gorkom bureau discussed the question on measures for strengthening the protection of the Black Sea from pollution. Taking the recommendations of prominent scientists and specialists into consideration, the gorkom bureau outlined ways to improve the quality of sewage systems and settling facilities undergoing renovation or construction. To strengthen control over the construction, a staff has been set up under the direction of D. Mandzhaladze, first secretary of the party gorkom. Many collectives of the industrial enterprises in Batumi have been called on to help the builders. [Text] [Moscow PRAVDA in Russian 18 Nov 77 p 27 8545

NEW FILTER--Letter from M. Budylin, candidate of engineering science-- Paint and varnish coats are used in practically all sectors of industry. Spray painting of articles is the most widespread. However, this method has a substantial shortcoming: a paint and varnish shop discharges 10,000 to 15,000 cubic meters of polluted air per hour. Filters for dry, wet and combined cleaning basically collect suspended particles of paint matter and capture little of the gaseous fractions--solvent vapor. Minmedprom [Ministry of Medical Industry] specialists have designed a filter with a centrifugal paint-collecting screen. It permits capturing 70 to 80% of the pigment and the condition of the collected pigment is not inferior to the original. Organization of centralized production of these devices will have a substantial economic and ecological impact. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 77 p 13 8545

ATMOSPHERIC POLLUTION MONITORING EQUIPMENT--Letter from Ye. Mospanov, associate of the Minpribor [Ministry of Instrument Building] press center-- The All-Union Scientific Research Institute of Analytic Instrument Building develops analytic instruments for protection of the environment--and more precisely, the atmosphere. One of the major projects in development at the institute is an analytic system for recording dust in the atmosphere using optical quantum generators. A laser is used as a probe. Measurement accuracy is right up to millionths of a gram per cubic meter of air. But it is important to know not only the quantity of dust in the air, but also its composition. A working model of an instrument which determines, if one may say so, the "kind" of dust, by proton beam radioscopy in a special filter, has already been developed at the institute. These filters were also developed at the institute. Experiments have shown that the new instrument is capable of determining the element composition of even the most minute, microscopic impurities. Also being developed at the institute are various instruments for determining the content in the air of automobile exhaust gases. An instrument developed here for determining the content of sulfur dioxide is in series production in Smolensk. An instrument for determining the total amount of noxious hydrocarbons discharged into the air by automobiles has already been checked out by tests and readied for production. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 77 p 13 8545

GREECE

INVESTMENTS IN POLLUTION CONTROL BY ALJMINUM PLANT

Athens O OIKONOMIKOS TAKHYDROMOS in Greek 24 Nov 77 p 34

[Text] The clear comeback registered by the aluminum market during the second semester of 1976 was a decisive factor in the satisfactory results achieved by Aluminum of Greece, Inc. during the last year. Thus, the company's total gross sales registered a 12.3 percent increase, while gross earnings were 23.4 percent higher than in 1975. Similarly, the cash flow rose to \$38.5 million, compared to \$30.9 million for 1975, an increase of 23.4 percent.

These facts are stressed in the board of directors' report to the stock-holders, which also includes the following:

"Export sales of alumina rose to 195,000 tons. Aluminum sales rose to approximately 135,000 tons, compared to 128,000 tons last year, registering an increase of about 5 percent.

This increase is due to the excellent results achieved on the domestic market, where 38,255 tons were sold in 1975 as against 84,174 tons in 1976, an increase of more than 25 percent. It must be stressed that this rapid increase--a phenomenon that has been continuing for many years--already constitutes proof of both a development in consumption on the domestic market and of the good results achieved on the export market by Greek processors.

Total gross sales rose to \$146,877,470, an increase of 12.3 percent over last year's.

Investments

In the field of industrial investments, and in a continuing simultaneous attempt to stabilize its productivity potential, the company completed in 1976 the second phase of its anti-pollution campaign. At the end of its operations, series B, encompassing 260 electrolysis basins of a total 780, had been completely covered, and the equipment to trap gases had been

placed, just as had been done with series C the year before. At the same time, the company has begun installing the equipment to trap gases on all the basins of series A, an operation which will be completed before the end of the first semester of 1977. Lastly, the installation of the equipment to filter the electrolysis gases on series A and B will be completed within the same timetable. This pollution control program, the total cost of which will rise to more than \$30 million--with more than 55 percent of this amount to be paid in drachmas--will thus be completed within 3 years, as had been originally planned. It will significantly improve the conditions of work and will eliminate environmental deterioration."

It was stressed that "In general, however, sales of alumina and aluminum are registering a slight weakening in comparison with previous use. Indeed, while the company was storing significant reserves of the metal in view of the comeback, it was also successful in avoiding an excessive increase of expenses related to financing and kept its production at a level lower than its theoretical peak. As a result, production of hydrated alumina was 462,000 tons, compared to 475,000 tons for the previous period, and production of aluminum was 134,000 tons, compared to 136,000 tons for the previous period...."

Speaking at the general assembly, the president of the company, Claude Massol, said, among other things:

"...I feel both honored and deeply satisfied to be speaking for the first time at this general assembly in the capacity of president of Aluminum of Greece, Inc.

"I am taking over the important duties of Mr Marsandise (?), whose close collaborator I have been for many years, and to whom I wish to express from this rostrum, on behalf of all of you here, the profound appreciation he deserves for the extremely significant part he played in the establishment and development of this great industrial complex.

"The 11 years I have spent at the service of our company have given me the opportunity, among the difficulties inherent in all enterprises that must face economic hazards, to appreciate, at the same time, the uninterrupted course of its development, its structural stability, the might of its economic vigorousness, both on the Greek national level and that of the regional development of Voiotia.

"All of us, who are responsible for the fate of the Aluminum of Greece, Inc., have a sense of pride, and simultaneously feel conscious of our duties, the seriousness of which must be in direct relation to the successes that have been achieved. These successes are due in great part to the Franco-Hellenic cooperation.

"Our hopes for the future are strengthened by the confidence we share with Greek public opinion about the entrance of Greece into the Common Market...."

It must be pointed out that the board of directors is made up of the following:

Pierre Jouvain, honorary president, Jacques Marsandise, honorary president, Claude Massol, president, Georgios Spentsas, vice president, Ioannis Serpieris, vice president, Konstandinos Iliaskos, counselor, Georgios Gondikas, counselor, Pierre Greselle, counselor, Loukas Kyriakopoulos, counselor, Dimitrios Marinopoulos, counselor, Mikhail Pesmazoglou, counselor, Maurice Serpette, counselor, Philippe Thomas, counselor, Marcel Violet, counselor, Olivier Besse des Berques, representing the Pessinet company, Usines Coulement Jacques Desasare de Montgaillard, representing the French company for the development of Aluminum of Greece, Inc. Philippe Liautier is the general director.

8980
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GREECE

MINISTER: NO NEW FACTORIES IN ATTIKI

Athens TA NEA in Greek 10 Nov 77 p 1

[Text] Minister of Industry Konofagos stated yesterday that no new industries will be located in the Attiki area, adding that:

--Industries already established in Attiki may expand, but only within the limits of the area they occupy at present, and provided that present pollution levels will not rise as a result of such expansion.

--Small, unobtrusive handicraft industries using no more than 20 hp may be established; however, they will be subject to strict pollution control measures.

Referring to Elefsis, the minister stated that:

"The study of pollution in the Elefsis area, which had been undertaken by the competent division of the ministry, has reached completion. Concrete measures will be announced soon."

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GREECE

BRIEFS

FINES FOR MAZUT SALE--Fines of up to 5,000 drachmas--and 20,000 drachmas in the case of repeat offenders--will be imposed on persons who, despite the ordinance prohibiting it, are using mazut to centrally heat apartment houses in the Attiki and Salonica areas. This reminder was issued yesterday by the Ministry of Industry and Energy. The announcement also stresses that liquid fuel dealers have been directed to refuse delivery of mazut for such purposes in the above areas. [Text] [Athens TA NEA in Greek 9 Nov 77 p 1] 8980

CSO: 5000

SWEDEN

ENERGY INDUSTRY URGES ADOPTION OF NUCLEAR WASTE PLAN

Stockholm DAGENS NYHETER in Swedish 8 Dec 77 p 1, 32

[Text] On Wednesday the energy industry submitted its proposal on final storage of nuclear waste, together with a request from Vattenfall to start Sweden's seventh nuclear reactor, Ringhals 3, in February next year. The industry believes that conditions for a "completely safe" storage of nuclear waste have been met.

The study, Project Nuclear Energy Safety (KBS), has cost over 50 million kronor. According to this study, the burned fuel after a cooling period will be shipped to La Hague, France for processing.

The glazed radioactive waste will be returned to Sweden, where it will be put in dry storage within a mountain chamber for at least 30 years before it is permanently buried deeply within Swedish granite, embedded in quartz sand and benthonic clay.

Industry's Analysis Clear: Waste Problem Solved - Start Ringhals III

"In some respects Sweden is ahead of the United States, as in solving the problem of nuclear waste. Stipulations for a "completely safe" storage have been met, according to the energy industry's analysis. Therefore, Vattenfall has requested that Ringhals III be started in February. Not only will the French processing work, but the final storage beginning in the year 2020 will also be safe, according to energy industry analysts.

"In any case, I am convinced that the study provides a satisfactory technical and scientific basis so that the government can push the start button on Ringhals III in good conscience," says Vattenfall's managing director Jonas Norrby.

Should the government disagree, Norrby said he would loyally comply with the government's directive and he did not want to speculate on leaving the post of managing director.

The energy industry's study on nuclear waste, called KBS (Nuclear Fuel Safety), is a study which on the whole is based on the old atomic waste analysis, AKA. As stated earlier, the nuclear waste problems are solved, at least in theory.

KBS states that the French processing will work; they have faith in the glazing process of radioactive waste and in the final storage of it forever on Swedish soil. The final storage will begin about year 2020 and it will work, according to power company analysts.

"Ahead of USA"

Has the study managed to solve the nuclear waste problem in 10 months? Have we made great scientific progress?

"They say no. The study is based on earlier AKA solutions. But the combination is unique internationally."

Is Sweden ahead of the United States where they do not believe they have found the right solution?

"In some respects yes, according to KBS project manager Ingvar Wivstad, who is normally technical director at Vattenfall."

The KBS leadership is of the opinion that USA has not managed to come up with a solution the same way Sweden has done it, and we consider it in our favor that conditions forced the Swedish industry to come up with an answer to prove that they could be met.

According to the nuclear power companies, it is now just a matter of starting more nuclear energy plants -- but do we have a "completely safe" solution?

What does "completely safe" mean? This is the great political nuclear energy question. That is Vattenfall's interpretation:

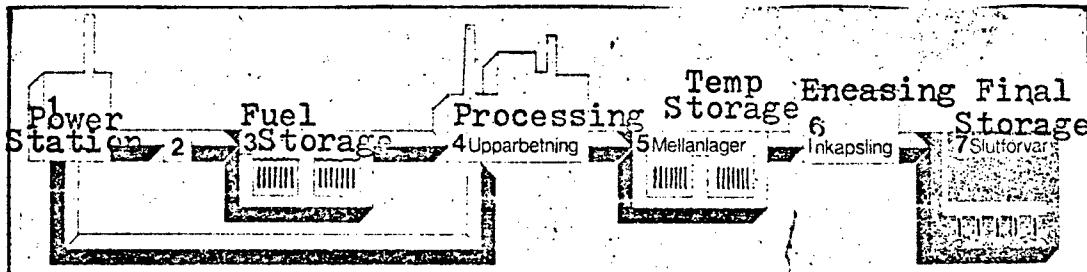
"We learn from the power companies' preliminary studies that such a draconic (inhumanly strict) interpretation of the concept "completely safe" has no meaning in this case."

And the nuclear power companies' report states "that no human activity can be said to be completely safe in the strictest meaning of the term."

This spring KBS will issue a study on how Sweden should handle the waste problem without relying on foreign help, i.e., without French processing and glazing or storage in USA.

And Falldin's government must now approve or reject the opinions of industrial experts. Vattenfall wants a speedy answer.

And if the government approves the KBS analysis, Sweden will be the first nuclear energy country in the world to officially announce that the waste problem has been solved.



The nuclear fuel course: 1) The burned fuel is first stored in a basin until the power plant can 2) transport it to a central storage 3) an underground basin which they seek permission to build in Forsmark or Oskarshamn. From there, or directly from the nuclear power plant basin, the fuel can later be shipped to 4) France for processing, where they remove plutonium and uranium from the burned fuel and later encase the more radioactive waste in a special glass substance. 5) Later this waste will be temporarily stored in a mountain chamber in Sweden for 30 years. 6) After that period the waste can be further encased and buried 500 meters down in granite somewhere in Sweden, about year 2000. The hole will later be plugged. In 30 years there will be a 36 kilometer-long waste tunnels inside the mountain.

Olof Johansson: Government Decides -- Not Industry

"According to stipulations, it is the government and not the government and not the nuclear energy industry that shall decide whether Project Nuclear Fuel Safety (KBS) has found a completely safe way of storing nuclear waste," says the Minister of Energy Olof Johansson (center).

"I would be much surprised if the KBS analysis does not comply with the stipulations as far as the industry is concerned," he says.

"Of course, they are entitled to have faith in their own work. Others have believed nuclear energy problems would be solved without having to present specific solutions."

The KBS material and Vattenfall's application for Ringhals III shall be examined by the government chancellery. After that, the recommendations will come up for debate. The government will make its decision as soon as possible after that.

Olof Johansson left for Algiers on Wednesday.

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TURKEY

BRIEFS

MINISTER FAVORS REFORESTATION--Forestry Minister, Sabahattin Savci, in a recent statement was quoted as saying that air pollution in the major cities can be prevented by reforestation. Savci, in a report dealing with air pollution and other environmental problems, stated that a special arrangement has been worked out with the Beynam Forest in the Ankara area for the gradual reforestation of the capital, while in Istanbul efforts have been undertaken to develop the Belgrad and Fatih forests. [Excerpts] [Istanbul MILLIYET in Turkish 17 Dec 77 p 12]

CSO: 5000

WEST GERMANY

POLLUTION CONTROL PROGRAM FOR RHINE OUTLINED

Bonn DIE WELT in German 15 Nov 77 p 3

[Article by Peter Weigert: "Laboratory Ship Max Pruess Fights on the Rhine for Clean Water"]

[Text] In the chemical factories on the Rhine the factory security guards reach for the telephone whenever the strikingly pointed bow of a light gray ship nudges up to the sewers and the name "Max Pruess" can be read above the bow anchors. The laboratory ship of the Duesseldorf land government has acquired a name as a keen watchdog on the river; one cannot help but be slightly nervous when the ship is seen "snooping around" in the drain pipes.

Captain Alfred Oehmig has been sailing the "Max Pruess" since 1964. Captain Oehmig says: "When we used to go from Duisburg to Cologne we would see five or six oil slicks over 1 km long on the Rhine; today we see one a month."

The muddy waters of the Rhine are the elixir of life for 20 million people; from wells in the vicinity of the river, water works process it directly or "bank filtered" into drinking water. The old joke of the water management official that from its source to its mouth the Rhine flows through the human organism seven times is exaggerated. Yet 13 billion cubic meters were removed from the Rhine in 1972, in 1980 it will be 24 billion. That is far more than a full third of the Rhine water in years of average rainfall. Industry consumes a large share of the water pumped from the river--200,000 liters per ton of steel, 1,000 liters for 1 kg of paper, 2,500 liters for 1 kg of yarn.

Modern Fast Analysis

Joerg Humann, government architect in the "Working Group of the Laender for Keeping the Rhine Clean" in Duesseldorf, says: "The Rhine is, moreover, a means of transport." Yet he is thinking less of the 244,000 ships with a total of 120 million tons of cargo that pass the border station at Emmerich every year, but rather of the "Rhine's salt train." Every day almost 30,000 tons of salt flow past Emmerich, about the same as almost 1,000 freight cars. Approximately 250 carloads are washed out of the soil, and 340 come from the French potassium mines in Alsace. Just short of Bonn, 90 more are coupled to the "train" and in North Rhine-Westphalia there are 300 more carloads.

In the large cabin on board the "Max Pruess" there are the most modern fast analysis devices which immediately examine water samples taken from the river and the sewers of large factories. Way at the front of the bow there is even a toilet which has been converted into a second automatic laboratory. Oxygen content of the water, temperature, electrical conductivity (as an indicator of salt content), acidity and turbidness are all constantly being recorded.

Relief from Cargo of Filth

"Most sewers empty into the Rhine under the water surface; for the most part, we cannot offer any direct proof of culpable pollution," says Captain Oehmig.

Two international agreements are to provide additional relief for the Rhine from its cargo of filth. In order to lower the salt content, the French are pumping up to 40 kg of chloride salts per second into 1,800 m deep earth borings instead of into the Rhine. The Netherlands, Switzerland and FRG are sharing in the costs of about DM65 million for the process that has been set up for 10 years. A second agreement, with participation of the EC in Brussels, has drawn up a list of chemical materials whose introduction into the Rhine should be completely stopped. These include plant poisons, mercury and all carcinogenic materials.

"In all, we are unfortunately dealing with 2,000 substances in the water of the Rhine," said Herbert Seegers, spokesman for the working group of the 82 Rhine water works. Salt is the chief concern. The water works have reproached four large factories on the Rhine because together they pollute the water of the Rhine just as much as 10.1 million people. Seegers says: "For 25 years we have been successfully purifying drinking water, but in view of the many new developments in the chemical industry, we do not know how long we can still fight it."

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WEST GERMANY

'NOISE POLLUTION' CONTROL IN BERLIN DISCUSSED

Bonn DIE WELT in German 17 Nov 77 p 17

[By Juergen Dobberke]

[Text] "For property owners adjoining Tegel airport on the east (Reinickendorf and Wedding) there will be no marked decrease in noise until the number of takeoffs to the east is substantially reduced and less noisy aircraft are put into service." That is one of the sentences that will ring in the ears of the Wedding district officials today when they consider the "Report on Aircraft Noise" from their public health administration, which is based on "metrological examination and evaluation of aircraft noise in the Wedding district."

The "Society for Noise Abatement" e.V. [registered association] made and evaluated precise measurements at various points in the area surrounding the airport. The result is a "list of the most aggravating deficiencies which to date could not be remedied," presented by Eberhard Banholzer, city councilman for public health. It contains the following points:

--"It appears that the 20:80 percent distribution of takeoffs to the east to takeoffs to the west was indeed the basis for figuring the noise prevention zones, but probably does not correspond to the facts." [Editor's note: The percentage is actually 37:63.]

Furthermore: "If this is confirmed, if it should perhaps be determined that a different proportion should ultimately be used as the basis, then the noise prevention zones would have to be refigured at the appropriate time.

--Establishing prevention zone 3 would no doubt be unrealistic in the foreseeable future for reasons of financial policy.

--On a long term basis types of aircraft that are less noisy must be put into service. It is further stated that noise prevention would have to be built at a decisive point into the procurement policy of the airlines as an essential factor.

Summarizing, with the Society for Environmental Protection and Noise Control, e.V., it could be determined that "a marked decrease in noise will occur in the next few years if currently existing routes and flight orders are observed, if takeoffs to the east are substantially decreased and, above all, if less noisy aircraft are put into service.(") [No closing quotes in text]

Compared with the first few months after the opening of the airport on 1 December 1975 a great deal has been undertaken to decrease noise disturbances, primarily since the appointment of a special "aircraft noise commission" made up of citizens and agency representatives. Pilots of the allied airlines were also invited to the meetings.

Establishing an additional 2nd prevention zone itself represents a concession for Berlin, because elsewhere in the FRG, there is normally only one noise prevention zone which in practice is marked only for the immediate vicinity of the airport.

Zone 2 forces the authorities to equip about 14,000 dwellings in Wedding, Reinickendorf and Spandau with sound absorbent windows--there are 25 in zone 1! The boundaries of zone 2 are formed in the east by Muellerstrasse in Wedding and in the west by a strip of territory which stretches beyond Eiswerder Island in the Havel.

The necessity for noise prevention is demonstrated by the determination of the Society for Noise Abatement that during overflying after takeoff the level recorder frequently recorded maximum noise levels of over 90 decibels [db], and even as high as 103 db at Themsestrasse (1 db corresponds roughly to 1 phon; loud street traffic gives a measurement of 90 dbs.) Measuring points were located, among others, on Nachtigallenplatz and on Brunnenstrasse, Brienerstrasse and Oxfordstrasse.

While the noise differential in reference to normal street noise is not so substantial on main and through roads, it frequently registers 40 db on quiet residential streets within the boundaries of noise prevention zone 2.

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END